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Application of the Principles of Water Purification to the Control of Swimming Pools*

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UNTIL quite recently the regulation of swimming pools generally received very little attention from health departments, either state or municipal. Many pools, where insufficient funds handicapped them, were built without any designing, and were constructed as a concrete tank to be operated on the "fill and draw" principle. A small amount of fresh water was added daily, and occasionally the pool was emptied, scrubbed and refilled.

Recently a number of cities have taken an active interest in the proper operation of their swimming pools. There has been a more or less scientific development and a more exacting control of the operation of the pools in these cities. The possibility of transmission of disease in swimming pools did not seem to arouse much attention until the early part of the 20th century. In 1915,[1] Manheimer cited 19 authorities who reported venereal, ocular, aural, or intestinal diseases in pools. Hinman, in 1929, classified the diseases which could be contracted in the swimming pool. The Joint Committee on Bathing Places, in 1929, reported on foot diseases.

Detroit [2] carried on some work on skin diseases, beginning in the fall of 1929 when a dermatologist was engaged by the Health Department to do special work along this line.

Among the most prevalent infections which would possibly result from swimming are the common cold and sinus and middle ear infections. There are available very few data giving definite information concerning the part played by a swimming pool in the transmission of communicable diseases. The consensus of opinion of authorities seems to be that there is a potential danger of person to person transmission of pathogenic bacteria added to the pool by swimmers, and that this danger may be greatly minimized or eliminated by an efficient disinfecting agent

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such as chlorine. It is also believed that perhaps the greatest danger is of auto-infection, meaning the transfer of organisms harbored by the individual to more susceptible parts of the mucous membrane or the irritation or removal of protection from the membranes, resulting in an attack by organisms already there. From the standpoint of actual health protection afforded, and also esthetic considerations, it is now generally granted that facilities for effective sanitary measures and close supervision of the application of these measures is necessary and justifiable.

DEPARTMENT OF HEALTH PROBLEMS

The problems encountered by a city health department in developing a municipal swimming pool program usually indicate the following procedures:

1. A study of the existing pools and collection of data on each pool as to construction, equipment, and operation
2. A study of swimming pool control programs in other cities and states by correspondence and actual visits and by accumulating copies of rules and regulations successfully used
3. The preparation of a swimming pool ordinance to control existing swimming pools and to provide for approval of design and construction of new swimming pools
4. The initiation of a program of systematic supervision including all pools
5. Securing coöperation of all swimming pool owners and operators in furnishing monthly reports and making recommended improvements
6. Development of a sound educational program by which the public will be informed and induced to select only the safest places for swimming

A state-wide problem in the control of swimming pools has been created by the stimulation of interest in bathing and swimming. This interest has been created through health education, extensive advertising, and automobiles making it easy to travel greater distances for recreational purposes.

The construction of a large number of artificial pools in late years has been partially due to the increasing pollution of streams and other natural bathing places.

Education of the public has created an attitude demanding an acceptable water in pools. The owners expect regulations and look to the city and state health departments for advice and recommendations for proper operation. Those contemplating the construction of new pools want advice regarding all points which will affect the operation and production of a satisfactory water.

State departments of health are expected to and have a responsibility to give competent advice on the operation of swimming pools. In actual practice these departments are faced with a wide variety of problems. Equipment and other facilities range from nothing to the modern well equipped efficiently operated natatorium. Immediate results must be obtained in spite of inadequate equipment and makeshift operation, and at the same time recommendations of the department must be successful in order to obtain improvements as recommended. The study covered in this paper was made for the purpose of obtaining additional data and experience to be used as a basis for more authoritative technical service by health departments.

DEVELOPMENT OF THE CONTROL AND STUDY PROGRAM

No record or evidence of any effort on the part of the health department to control swimming pools can be found previous to 1929. Samples of water have been collected each year apparently for information without any effort to better conditions.

Early in the year 1930, it was decided to develop a swimming pool program in Memphis and part of the time of one inspector was assigned for the regular collection of samples for

bacteriological examinations and to instruct the owners and operators of swimming pools in the use of chlorine for swimming pool disinfection.

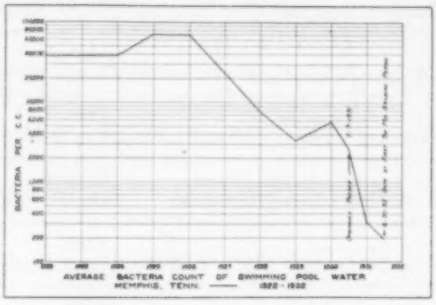
An attempt was made to assemble accurate information on quality of water and method of operation since 1922. The averages of bacterial counts on the total samples taken from all pools by the City Health Department are shown by years in Figure 1. A rapid improvement is noted after the year 1926. No comprehensive or reliable records of operation were found to be available. A monthly report form was prepared and put into immediate use, including all pertinent operating data and results of bacteriological examinations, the last being filled in at the City Health Department office.

A coöperative arrangement was approved, under which a sanitary engineer of the State Health Department was assigned to work with the Division of Sanitation of the Memphis City Health Department throughout practically all of the bathing season of 1931, in order to carry out a control and study program covering the various points mentioned. This program was carried out by the writers, assisted in routine work by a full-time sanitary inspector of the city.

A systematic survey of 14 of the principal pools in the city was made, a tabulation of the data obtained being given in Table I. A study of this indicated that on account of the wide variety of conditions with reference to construction, equipment, bathing load, and ability to make extensive improvements, some revision of the proposed ordinance would be necessary. The principal effect of these changes was to make allowance for light bathing loads, unusually good operation, and other favorable conditions, and under favorable conditions to extend the time limit within which complete equipment would be required on existing pools. Strict requirements for new pools remained in the ordinance as finally passed in July, 1931. The control and study program was carried out under this ordinance, a copy of which may be obtained from the City Health Department of Memphis.

FIGURE 1

DEPARTMENT OF HEALTH, MEMPHIS, TENN.



Each pool was required to have an orthotolidine testing set, either a commercial set or an inexpensive one made up by the City Health Department. Daily records of operation available for examination by health officials were required. The routine duties of the inspector carrying out the control program included, a visit to each pool at least once a week, personally checking residual chlorine in the pool, and collecting samples for bacteriological examination. Two samples were regularly collected from each pool, one from the shallow and one from the deep end, the orthotolidine test being made at the same point and at the same time. The location of the sampling point, and time of weekly visits to various pools, were varied. Pool owners were notified by mail of the results of examinations and instruction by visit was given when laboratory reports were found unsatisfactory. Routine instructions were given to maintain the residual chlorine between 0.2 and 0.5 p.p.m. at all times a pool was in use.

TABLE I

SWIMMING POOL EQUIPMENT AND BATHING LOAD DATA

1931

Department of Health, Memphis, Tenn.

Name of Pool	Operator	Official in Charge	Capacity of Pool in 1,000 Gal.	Type of Pool	Year Built	Pumps	
						Number	Total Capacity GPM
Baptist Hospital	Mr. Earheart	Supt. G. D. Sheats	24	F & D	1920		
Catholic Club	H. F. Linder	Mgr. Marie Verrett	100	Recirc.	1923	1	180
Country Club	Miss Eickling	Pres. Dr. R. McKinney	90	F & D	1920	(Equipment 1	140
East End	James Grisham	Owner H. W. Brennan	400	Recirc.	1923	1	278
Elks Club	W. O. Butler	Pres. Geo. Hasinger	98	Recirc.	1927	1	160
Fair Grounds	J. O. Graham	Supt. Dave Renfrow	1,250	Recirc.	1922	2	520
Malone	Curtis Turner	Supt. Dave Renfrow	400	F & D	1928		
19th Century Club	N. Stryker	Pres. W. Campbell	98	Recirc.	1926	1	250
Shrine Club	Mr. Brjscoll	Sec.-Treas. W. A. Woodmansee	98	Recirc.	1924	1	140
St. Agnes	Miss Marquett	Sister Margaret O. P.	52	Recirc.	1927	1	60
University Club	Mr. Clark	Pres. Norman Monaghan	55	F & D	prior 1925		
Washington Park	V. J. Majestic	Supt. Dave Renfrow	914	F & D	1925		
Y. M. C. A.	R. H. Bruce	Gen. Sec. R. C. Pifer	45	F & D	1909	(Equipment 1	
Y. W. C. A.	Mrs. Muir	Supt. Mrs. Muir	70	Recirc.	1926	1	120

* (Becker's Formula, p. 38, Vol. XV, *J. Am. Assn. for Health & Baths.*)

EXPERIMENTAL STUDIES—GENERAL

A survey of the swimming pools in Memphis showed 14 pools in 1931 with approximately 250,000 swimmers and an additional 6 suburban pools patronized by Memphis people. The problem in Memphis was to control and raise the standard of these pools, all but 2 of which had been built previous to 1926 and one of them as early as 1909. They

TABLE I (Cont.)

SWIMMING POOL EQUIPMENT AND BATHING LOAD DATA

1931

Department of Health, Memphis, Tenn.

Filters		Present Turn-over Period in Hours	Average Daily Attend-ance	Maxi-mum Daily Attend-ance	Days Pool Oper-ated	Total Attend-ance	Turnover Permissible for Present Bathing Load •	Sterilizing Equipment
Num-ber	Total Capa-city GPM							
			22	30	67	1,476	14	None
2	170	10	27	200	365	10,027	12	2 Violet Rays
not used) 2	120		49	100	96	4,706	15	Chlorinator (not in use)
3	250	27	350	1,500	127	44,456	10	W&T Chlorin. & Ammoniator
2	170	10	68	150	365	24,700	13	2 Violet Rays
3	450	46	825	3,000	80	66,071	11	2 W&T Chlo. 1 W&T Ammo.
			470	800	80	37,600	12	None
2	76	21	75	250	247	18,500	11	Violet Rays
3	250	12	53	150	60	8,820	13	Violet Rays
2	100	14	20	40	120	2,400	17	M.S.P.M. Chlorinator
			31	100	77	2,371	12	None
			65	500	80	5,200	19	None
not used) 2	75	10	53	100	365	19,250	12	None
2	42	28	10	20	75	750	23	None

N.= Number $\frac{\text{Bathers.}}{\text{Days}}$ G.= Capacity of pool in Gal. T.= Turnover in Hours.

$$T = \sqrt[3]{\frac{3.48 \times G}{N}}$$

presented a multiplicity of problems with only about one-half of them "recirculating" pools, several of these with distinctly poor distribution of inlets and inlet flow and with turn-over periods varying from 46 hours to 10 hours. Four of the latest designed pools were equipped with ultra-violet ray machines, while 3 were equipped with chlorinators.

The bacteriological examination of samples soon showed that it was impossible to obtain counts below 200 per c.c. and absence of *B. coli* in 10 c.c. portions without the use of chlorine or chlorine compounds. The problem of securing better distribution of chlorine in the recirculating pools and of maintaining chlorine residuals in pools where it was necessary to add chlorine by hand made it necessary to study the various types of pools with regard to chlorine disinfection, distribution of inlets, use of anhydrous ammonia and ammonium sulphate to maintain residuals, control of algae, and other problems.

The major portion of the experimental work was devoted to a study of disinfection of pool waters from the standpoint of chlorine and chlorine compounds alone and in conjunction with ammonia and ammonium sulphate using machine and hand application. The primary object was the uniform production of a water which would meet the drinking water standards of the U. S. Public Health Service. Standards of bacterial quality are not uniform between various states, but since the average bather will swallow some water while in the pool the writers believe that it should meet the above standards. The study was conducted with this in mind, and to find whether it is practicable to apply such a rigid standard to pool waters.

The studies included the practicability of enforcing changes on existing pools which do not have equipment sufficient to meet the demands of present-day practice, such as filter capacity for an 8- or 12-hr. turn-over, scum gutters entirely around the pool, proper inlets, number and spacing, apparatus for the application of chlorine gas and anhydrous ammonia.

Further study was devoted to the sand beaches, the control of algae and slime on the floors of pools. There was some question whether sand beaches using relatively clean sand would prove detrimental to the pool water, and whether under these circumstances it would be necessary to require the installation of additional showers to be used by each bather before returning to the pool. Slime on the floors of pools has caused considerable trouble and its elimination by the use of chlorine was studied.

Algae control did not receive as much consideration in this study as its importance would indicate since it is a major problem in most outdoor pools. Some data were obtained during this past summer at 2 new pools located in Nashville, Tenn.

Three pools were selected for study. The Municipal Fair Grounds Pool, 1,125,000 gal. capacity varying in depth from 3″ to 10′ was selected on account of its equipment which consisted of a complete recirculating system capable of turning the pool over in approximately 48 hrs., two Wallace & Tiernan vacuum type chlorinators, and an ammoniator. The pool is arranged as shown in Figure 2, equipped with a scum gutter extending entirely around it, inlets spaced entirely around the pool, a sand beach extending approximately one-half the distance around it, and compulsory showers. Good superintendence, supervision, and operation are provided, and spectators are excluded from the pool walkway and beaches by a metal fence.

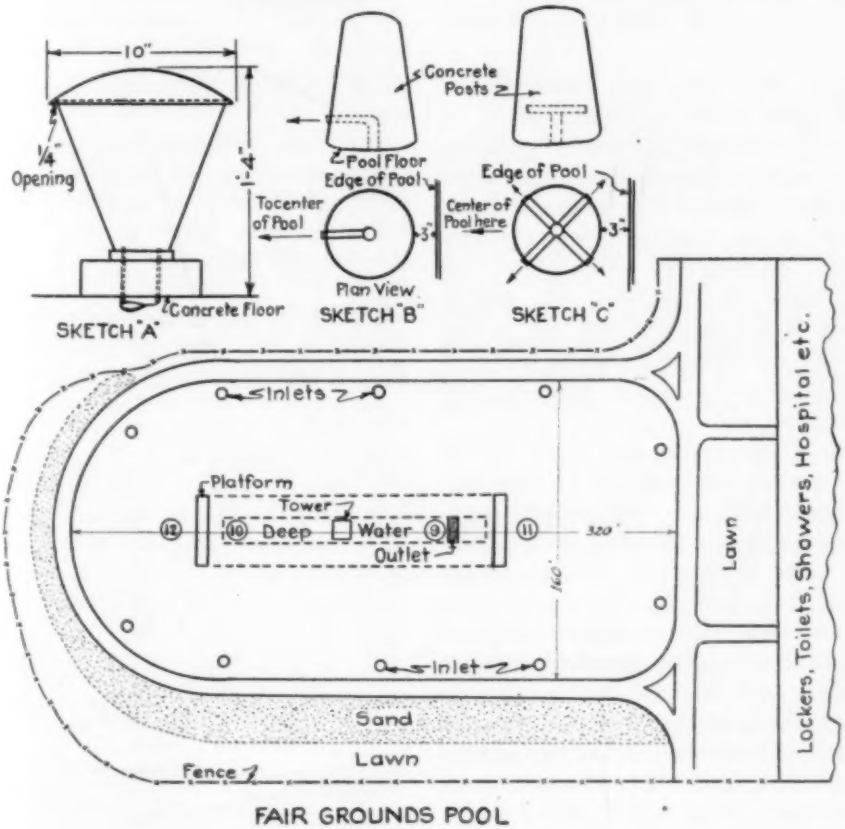
The East End Pool, rectangular, holding approximately 400,000 gal., has recirculating equipment sufficient to turn the water over in 27 hrs. at the rate of 3 gal. per sq. ft. of filter sand area and a chlorinator of Wallace & Tiernan manufacture type M.S.A. A scum gutter is provided only at the deep end with sand beaches at each end. The inlets, 4 in number, are at the shallow end (Figure 3). Showers are not compulsory. Water varies in depth from 2′ to 11′. It was necessary dur-

ing the period of this study to apply chlorinated lime solution and late in the season ammonium sulphate by hand. Spectators are not allowed on the pool walkway or beaches.

Malone Pool is municipally owned, holding approximately 400,000 gal. and varying in depth from 3′ 9″ to 10′, nearly square, and with a scum gutter at one end. Located 22′ below normal ground level it is a problem to keep surface wash out during heavy rains. A sand beach is located at one end. No equipment is available at this pool and all disinfection was accomplished by hand. Access can be had to the pool on all sides, no admission is charged nor are showers compulsory. Figure 4 shows the layout of this pool.

Samples for bacteriological examination were collected daily, except Sunday, from each pool. Four samples were collected from the Fair Grounds pool and 2 each from the others. Total count on agar 37°—24 hrs. was determined on each sample and tests for *B. coli* were made of 10 c.c. portions in standard lactose broth. *B. coli* results were partially confirmed. Three 10 c.c. portions were run on the Fair Grounds and East End Pools and one 10 c.c. on the Malone Pool samples. Practically all samples were collected during bathing periods, and usually during the heaviest bathing load. Samples were taken to the laboratory immediately and planted at once.

Tests for residual chlorine were usually made twice daily, morning and afternoon at the time and place the



FAIR GROUNDS POOL

FIG. 2

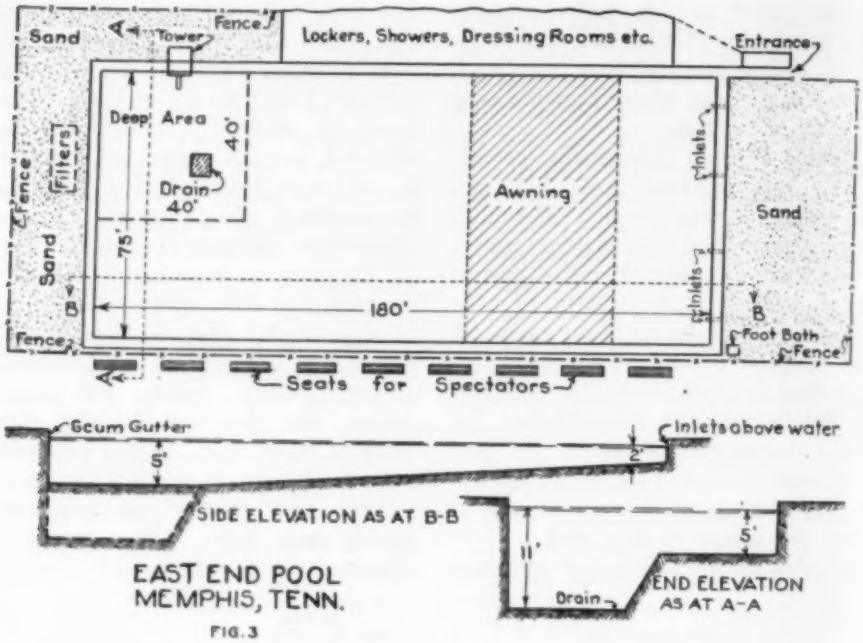


FIG. 3

samples were collected. Hydrogen-ion tests were made sufficiently often to show any marked variations. Operating data, such as hours the filters were operated, chlorine and ammonia used, water added, bathing load, air and water temperature, were kept as accurately as possible. A special series of examinations was run to determine the latent disinfecting value of the pool water using chlorine and ammonia.

Close supervision was given to the operation of the pools and at each suggestions made by the writers were complied with. Draining of the pools has been at frequent intervals, never more than 1 week elapsing between. A study was made to observe the effect of lengthening the intervals between draining.

Some data were collected on the cost at the Fair Grounds Pool, particularly of chlorine, ammonia, and water.

A short study was made of a salt water pool with particular reference to infections of the respiratory and aural tracts.

Particular attention was given to complaints from the bathers due to smarting of the eyes, especially when high residuals were carried, using chlorine and ammonia.

DETAILS OF EXPERIMENTAL STUDIES

Pool No. 1—Fair Grounds Pool—This is the first season during which

FIG. 4

TABLE II

Period	No. of Samples Taken	Average Bacterial Count Agar 37° — 24 hours	Sanitary Rating
1922–23–24	229	34,532	511
1925–26	39	50,895	346
1927	No samples taken		
1928	26	9,095	790
1929	No samples taken		
1930	13	1,178	950
1931 (Up to 7-7-31)	96	32	1,000
1931 (Since 7-7-31)	60	.8	1,000

TABLE III

Year	Pounds Used Cl_2	Pounds Used NH_3	Average Per Day Cl_2	Average Per Day NH_3	Total Cost	Days Operated	Cost per Day
1928	2,800	0	30	0	$343.80	93	$3.70
1929	3,300	0	37.5	0	358.08	88	4.07
1930	2,500	0	29	0	232.92	86	2.70
1931	1,450	253	19.3	3.4	179.20	75	2.39

any concerted effort has been made to study the operation of this pool, either from the standpoint of economy or better and more efficient operation. Before going into details regarding the study, the results of bacteriological examinations for previous years are given in Table II.

In previous years it has not only been difficult to distribute the chlorine equally throughout the pool, but excessive doses have been required to obtain even a trace in the middle. Following are the quantities of chlorine and ammonia used from 1928 to 1931, inclusive, with the cost.

It has been the practice to drain and clean the pool each week. This was done on Sunday nights, the pool remaining drained part of Monday, and refilled for use Tuesday morning. The costs of water for the years 1928–1931 are given in Table IV.

TABLE IV

Year	Total Cost of Water	Days Operated	Average Cost Per Day
1928	$2,648.64	93	$28.50
1929	3,469.15	88	39.50
1930	2,928.77	86	34.00
1931	1,784.03	75	26.50

The attendance during the years 1928–1931 has not shown any marked variations (see Table V).

TABLE V

Year	Total Attendance	Average Daily
1928	82,040	880
1929	79,309	900
1930	82,218	960
1931	67,762	905

The pool was opened on June 6, at which time only chlorine was being used. Both chlorinators were operated at capacity, applying approximately 40 lb. of chlorine per 24 hrs. Residual chlorine tests taken at 10 different points in the pool showed erratic results, varying from a trace in the deep part to more than 1.0 p.p.m. in the shallow portions. When the ammoniator was started, one chlorinator was shut down and the other left on, set at 30 lb. per day. The ammoniator was set at 5 lb. per day. After operating 24 hrs. an increase was noted in the residual chlorine content, and particularly in the middle of the pool a very noticeable increase was found. On the second day the residual chlorine tests were uniform all over the pool at whatever point it was tested. On the third

TABLE VI

EXPERIMENTS TO DETERMINE THE LATENT STERILIZING VALUE OF WATER COLLECTED FROM SWIMMING POOLS DURING THE SEASON OF 1931

Source of water	Fair Grounds Pool				Fair Grounds Pool				Fair Grounds Pool				Fair Grounds Pool			
Date collected	7/22/31				8/6/31				8/7/31				8/13/31			
Chlorination	Chloramine				Chloramine				Chloramine				Chloramine			
O.T. Test	0.5 p.p.m.				0.4 p.p.m.				0.3 p.p.m.				0.5 p.p.m.			
Culture	B. Coli from water				B. Coli from feces				B. Coli from feces				B. Coli from feces			
	Gas formation Lactose broth 10c.c.	1c.c.	0.1c.c.	Agar Count	Gas formation Lactose broth 10c.c.	1c.c.	0.1c.c.	Agar Count	Gas formation Lactose broth 10c.c.	1c.c.	0.1c.c.	Agar Count	Gas formation Lactose broth 10c.c.	1c.c.	0.1c.c.	Agar Count
Water from pool	–	–	–	0	–	–	–	0	–	–	–	1	–	–	–	0
Blank culture 1–100	x	x	x	1000	x	x	x	37	x	x	x	30	x	x	x	98
Culture & water 1–100 (1 min.)	x	x	x	500	x	x	x	35	x	x	x	17	x	x	x	79
Same (2 min.)	x	x	x	50	x	x	x	31	x	x	x	20	x	x	x	71
" (3 min.)	x	x	x	12	x	x	x	20	x	x	x	14	x	x	x	70
" (4 min.)	x	x	x	8	x	x	x	22	x	x	x	13	x	x	x	31
" (5 min.)	x	x	x	4	x	x	x	19	x	x	x	15	x	x	x	2
" (10 min.)	x	x	–	1	x	x	x	10	x	x	x	10	–	–	–	0
" (15 min.)	–	–	–	0	x	x	x	4	x	x	x	12	–	–	–	1
" (20 min.)	–	–	–	0	x	x	–	1	x	x	x	10	–	–	–	0
" (25 min.)	–	–	–	0	–	–	–	0	x	x	x	3	–	–	–	0
" (30 min.)	–	–	–	0	–	–	–	0	x	–	–	0	–	–	–	0

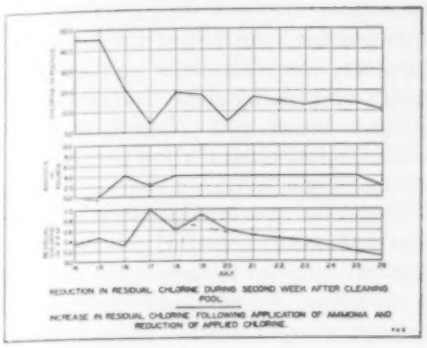
day residuals greater than 1.0 p.p.m. were found at all points. The Enslow Comparator was used for making all residual tests, and color was developed at the end of 4 minutes.

Throughout the use of ammonia-chlorine a definite cumulative effect was observed, most pronounced when the water was fresh and contributions of organic matter by heavy bathing loads at a minimum. For example, it was sometimes necessary to shut off both machines for periods varying from 4 to 24 hours in order to reduce chlorine residuals and to reduce the dosage when the chlorinators were started again. In order to maintain effective residuals it was necessary to increase chlorine dosages during the latter part of the 2-week period between cleaning and refilling the pool (Figure 5). It was also observed that an increase of the use of copper sulphate up to approximately 3.5 to 4 p.p.m., applied every third day, tended to reduce the chlorine demand, presumably by more effective control of algae, and to restore the cumulative effect of the ammonia-chlorine application.

Considerable attention was given to the bathers, particularly complaints of smarting of the eyes. There have been very few complaints made during this season. The pool manager has stated once or twice when the residuals were 1.0 p.p.m. he noted a smarting of his eyes.

During the period June 6 to August 8, 178 samples were collected from this pool for bacteriological examination. Figure 2 shows the location of the sampling points, which are numbered

FIGURE 5


REDUCTION IN RESIDUAL CHLORINE DURING SECOND WEEK AFTER CLEANING POOL.
INCREASE IN RESIDUAL CHLORINE FOLLOWING APPLICATION OF AMMONIA AND REDUCTION OF APPLIED CHLORINE.

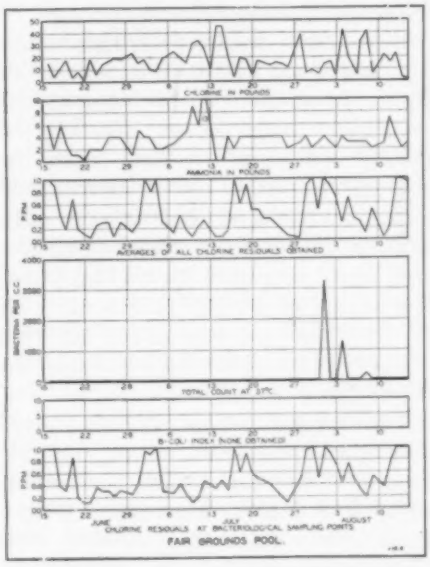
9, 10, 11, and 12. Sampling points 11 and 12 are in water approximately 3′ deep, while 9 and 10 are in the deepest part of the pool.

The results of the examinations during this period are shown graphically in Figure 6. The average number of bacteria per c.c. is 117. Eleven samples in 3 days showed high counts which totaled 16,900. However, on these days samples were collected by a person not accustomed to sampling. This must have been the reason for erratic results, since the residual chlorine tests on there 3 days indicated sufficient to produce low counts. Therefore, these results have been discarded and the average for 167 samples is 7 bacteria per c.c. The residual tests have varied from a trace to over 1.0 p.p.m. The results obtained indicate that with residuals between 0.2 and 0.5 p.p.m. uniformly low counts can be expected. With residuals less than 0.2 p.p.m. results may be erratic as indicated by an example. On different days each with water 12 days old and an average residual of 0.12 p.p.m. the average bacterial counts on 4 samples were 206 and 0.5 respectively.

The results of *B. coli* determination have been satisfactory, in that of 534 portions tested, only 4, or 0.75 per cent, have shown evidence of *B. coli* and after June 15 no portions were found positive (see Figure 6). Of the 4 positive portions mentioned above, 3 were from a single sample, having a zero bacterial count, an erratic result to which the writers attach little significance.

The total amount of chlorine used during 75 days of operation was 1,450 lb. Six days ammonia was not used, and the chlorine consumption during this time was 250 lb., an average of 41.7 lb. per day, or 4 p.p.m., based on total pool capacity. During 69 days a total of 253 lb. of ammonia was used, together with 1,200 lb. of chlorine. This shows while using ammonia-chlorine a daily average of 17.4 lb., or 1.7 p.p.m. of chlorine and 3.7 lb., or 0.35 p.p.m. of ammonia. The average ratio of chlorine to ammonia was 4.2 to 1. The ratios were varied over a wide range, the maximum being 12 to 1 and the minimum 1.25 to 1.

FIGURE 6



The cost of chlorine this season has been $.09 per lb., and the ammonia averaged $.1925 per lb. The average daily cost of using the chlorine ammonia process during 69 days was, chlorine $1.56 and ammonia $.71. The

average daily cost of using chlorine during the 6-day period was $3.75. These figures show that there was an actual saving of $1.48 per day using the chlorine ammonia process, assuming that results were comparable. Daily averages, showing quantities and cost of chlorine, for entire season of 1928 to 1931 inclusive have been given already in Table III.

The total number of bathers from June 6 to August 1, was 55,365, an average per day of 1,130, the maximum number on any one day being 3,193 and the minimum 21.

The water temperatures during the period June 6 to August 1, varied from 80° to 86° F. Although no correlation between water temperatures and sanitary quality was observed high temperatures will cause complaints from bathers and in southern states this may be the factor controlling frequency of draining outdoor pools.

The recirculating system operated 24 hrs. per day. Water was added each day to replace that lost as well as to flush the surface. The amount recirculated varied from 400,000 to 640,000 gal. per 24 hrs., with an average of 565,000 gal. Water added each day averaged 72,000 gal. The practice of draining and cleaning the pool each week was discontinued and the interval lengthened to 2 weeks. At all times during the season it has been easily possible to see the bottom in the deepest part of the pool.

The interval between draining could have been lengthened except for the slime which formed on the floor of the pool. The practice has been to drag 5 lb. of copper sulphate around the pool every other night. An increase of copper sulphate dosage to 7 lb. every 2 days was beneficial and a dosage of 50 lb., or 3.5 to 4 p.p.m. every third day was effective in killing algae after which the vacuum cleaner would pick up the slime. High chlorine residuals apparently would not prevent slime formation.

Determinations of pH were made at frequent intervals over a sufficient length of time to show that it is relatively constant and shows little variation. The minimum found was 7.4 and the maximum 7.6.

Pool No. 2—Malone Pool—Drainage facilities at this pool are very poor and a noticeable amount of mud accumulates on the sand beaches following every heavy rain. Water accumulates in depressions in the sand and bathers carry a certain amount of mud into the pool. This accounts to a large extent for the very noticeable turbidity 2 or 3 days after the pool has been cleaned and filled. It makes disinfection more difficult and less reliable (Figure 4).

Disinfection, in the absence of mechanical equipment, must be accomplished by hand application. Chlorinated lime, used at the rate of 15 lb. per day failed to show any positive residual tests. Assuming that the chlorinated lime contained 25 per cent available chlorine, this would be equal to 3.73 lb. of chlorine, or 1.13 p.p.m.

The writers gave this phase of the treatment considerable thought and it was finally decided that because of a high chlorine content, greater stability and ease in dissolving H.T.H. would be the most suitable chlorine compound. From previous experience it was felt that ammonia would be necessary to obtain residuals and, therefore, a technical grade of ammonium-sulphate having an NH_3 content of approximately 25 per cent was used in conjunction with H.T.H., providing a ratio of 5 to 1 chlorine to ammonia.

Ammonium sulphate was first used on June 23 and June 24. This preliminary test indicated that residual chlorine of 0.2 p.p.m. or better could be maintained throughout the day. After waiting for an additional supply

of ammonium sulphate the ammonia-chlorine treatment was again started on June 30 and continued with minor interruptions throughout the season.

A study of the results indicate that chlorine residuals can be maintained over a greater period of time by using ammonia, and ultimately there will be an overlapping from day to day with a cumulative effect previously mentioned. For example, on the morning of July 16, 8 lb. of H.T.H. and 4 lb. of sulphate were added. On the morning of July 17 the residual was 0.5 p.p.m. at all points and without further chlorine application on the morning of July 18 the residual was 0.1 p.p.m. at all points. The bathing load at this time was light. Typical results during a heavy bathing load would show 0.7 p.p.m. after treatment, 0.5 p.p.m. in the middle of the afternoon, and 0.2 p.p.m. on the following morning.

During the period from June 18 to August 1, 60 samples were collected. The majority of samples were collected between 1:00 and 2:00 o'clock in the afternoon, but quite a number of them were collected in the morning—usually before the chlorine or chlorine and sulphate had been added in order to determine the condition of the water several hours after disinfection and to reflect the addition of organic matter by the bathing load of the previous day.

The average number of bacteria per c.c. for the 60 samples was 664. Thirty-two samples were collected when the residual test showed 0.2 p.p.m. or above, with a maximum count of 100 and a minimum of 0. The remaining 28 samples were collected when residuals were less than 0.2 p.p.m. and, as already explained, many in the early morning before treatment.

Of 60—10 c.c. portions tested 18, or 30 per cent, showed evidence of *B. coli*. Of these 10 positive tests were on samples collected before any disinfection had been added that day.

A concise summary of quantities of disinfectant used during the entire season is not possible because chlorinated lime and H.T.H., both with and without ammonium sulphate, were used interchangeably, depending upon the supply on hand. In general, it may be stated that chlorinated lime, applying a dosage of 0.76 p.p.m., used without ammonia, failed to show any test for residual chlorine. The use of H.T.H., providing 2.2 p.p.m., available chlorine, would show residuals above a trace throughout the pool for a varying period of time, depending on the bathing load and the amount of organic matter in the water. The use together of H.T.H. and ammonium sulphate, providing average dosages of 1.45 p.p.m. of chlorine and 0.26 p.p.m. of ammonia, was sufficient to show residuals of 0.2 p.p.m. or better throughout the day. This is a ratio of 5.6 to 1.0, chlorine to ammonia.

Pool No. 3—East End Pool—Tests made during the 1930 season showed definitely that with the dosage of chlorine applied to this pool by the chlorinator, residuals were found only about 20′ from the inlets. In order to supplement the chlorine dosage from the chlorinator, a practice was made of adding a solution of chlorinated lime directly to the pool water.

The procedure for disinfection is somewhat out of the ordinary in that chlorination by means of a chlorinator was used, as well as hand application of chlorinated lime solution and ammonium sulphate. During the period June 16 to July 2 a solution of guaranteed 33 per cent chlorinated lime was used. According to the best figures obtainable, the accuracy of which the writers have some doubt, the average used was 16.1 lb. per day, a dosage of 5.3 lb., or 1.61 p.p.m. of chlorine. To this must be added the average amount of chlorine applied through the chlorinator, assumed to be 2.5 lb. per day,

averaging a total dosage of 7.8 lb., or 2.37 p.p.m. From June 16 to July 13 there was only 1 day on which the residuals were greater than 0.2 p.p.m., and the majority of the time they were either zero or just a trace. On July 13 the use of ammonium sulphate was started and it was used with either chlorinated lime or H.T.H. and also liquid chlorine during the remainder of the study. It was then possible to get residual tests above 0.2 p.p.m. fairly regularly, although there were times when lower residuals were found.

On August 8 the chlorinator began running 24 hrs. and after that time little difficulty was experienced in maintaining a residual between 0.2 and 0.5 p.p.m. in all parts of the pool. On August 11 the liquid chlorine dosage was increased to 8.8 lb. per 24 hrs. but on account of poor distribution this was found to cause odor near the inlets, and therefore, it was decreased to a dosage of approximately 5 lb.

It was found that the medium dosage of liquid chlorine in conjunction with chlorinated lime and ammonium sulphate solutions was most satisfactory in maintaining adequate residuals.

From June 16 to August 10, 93 samples were collected for bacteriological examination. The average of all bacterial counts was 558 per c.c.; 59 showed less than 200; and a majority of these less than 10. Checking total counts against chlorine residuals at sampling point, shows that in general with residuals of 0 or only a trace the count usually rises above 1,000 per c.c. There are relatively few samples showing greater than 10 bacteria per c.c. if the chlorine residuals were between 0.2 and 0.5 p.p.m.

A total of 279, 10 c.c. portions were tested for *B. coli*. A positive test was obtained on 15 or 5.4 per cent of the total. These *B. coli* results were more satisfactory than the total bacterial counts. During the period June 16 to August 11 the number of bathers was 34,349, or a daily average of 613, with a maximum of 2,263 on June 28 and a minimum of 5 on July 23. The water temperatures have varied between 76° and 86° F., and again there did not seem to be any correlation between water temperature and sanitary quality.

Relatively little trouble from algae was experienced and relatively little slime formed on the bottom. Water has been left in this pool 11 days and the small amount of slime that did occur was confined to the deep portion.

Accurate figures not being available, it has been estimated that approximately 370,000 gal. of water per day were recirculated, but no estimate has been made of the daily quantity of make-up water added. The practice had been to drain, clean and refill this pool twice each week, but since starting 24-hr. operation of the recirculating system, it was seldom drained in less than a week.

Salt Water Pool at Monroe, La.— The pool at Monroe has a capacity of 1,500,000 gal. and an average depth of 3.5′. Walls are constructed of concrete with a sand floor. No scum gutters are provided. Disinfection is accomplished by adding liquid chlorine to the suction line of a 900 g.p.m. circulating pump, taking the water from one end of the pool and putting it back at the opposite. The salt water is obtained from a flowing well discharging into the pool approximately 400 g.p.m. A chemical analysis at the time these tests were made showed 1,250 p.p.m. of chlorides. The bacteriological results of 4 samples collected from the pool showed relatively low counts, but examination of previous records indicated that about 25 per cent of all 10 c.c. tubes showed gas formation, *B. coli* results not being confirmed.

Three eye, ear, nose, and throat specialists were visited and requested to state their opinions on 4 questions as

to the relative number of infections believed to have been contracted from bathing in fresh or in salt water; the cause of the infection whether from the water or mechanical injury; the advantages if any of swimming in salt water; on the comparative number of patients treated this season as against previous seasons.

As would be expected, the answers to these questions varied. Two believed that there is no difference between salt and fresh water either in cases treated or as to the advantages for bathing. One thought that salt water was beneficial from both standpoints. All believed that there was greater danger of infection due to mechanical injury rather than actual transmission through the water. No definite comparison of number of patients treated this season as against previous seasons was obtained.

Municipal Pools at Nashville, Tenn.—Two municipal pools constructed during 1932 by the City of Nashville furnished an excellent opportunity to try out some ideas based on the Memphis study, and collect further data on operation. Experience in the design and first year's operation at these pools have confirmed the writers' opinion that exact hydraulic design of the system for distribution of water and chlorine to all areas is essential to success of operation.

The 2 pools are both of approximately the same capacity, with equipment and construction to comply as far as possible with present-day practice. The capacity of each is approximately 330,000 gal. An ammoniator is installed at each pool. Inlets are spaced around all sides and the piping as well as the inlet plates designed for equal distribution of the incoming water. Recirculating equipment is designed for an 8 hr. turn-over. With this design it is possible to note an increase of chlorine residual in the center of the pool within about 30 min. after the chlorine dosage has been increased, and uniform distribution of chlorine is obtained.

Arrangements of dressing rooms, showers, toilets, etc., are satisfactory. Unfortunately both pools are located near trees, which have given considerable trouble, leaves falling into the pools, causing an increase in the chlorine demand, and interfering with the operation of vacuum cleaners.

Wallace & Tiernan chlorinators and ammoniators are used, the chlorinators having a maximum capacity of 10 lb. per day. During normal conditions this apparatus in conjunction with ammonia gave residuals varying from 0.2 to 0.7 p.p.m. Following a storm, during which a considerable amount of leaves and dust was blown into the pools, residuals dropped practically to 0 and following this it was impossible to obtain residuals greater than 0.15, operating the chlorinators to capacity, until after the pools were drained and cleaned. It is advisable to have apparatus of adequate capacity to take care of abnormal as well as normal conditions. Good bacteriological results have been obtained.

Uniform doses of copper sulphate have been added to each of the pools, averaging from 10 to 12 lb. every third day, corresponding to a dosage of 3.6 to 4.2 p.p.m. It has been necessary to shorten the interval between dosing on a few occasions due to growth of algae. This is noticed first on the walls, particularly back of the ladders. At these times the chlorine demand is increased and higher doses of chlorine up to the capacity of the chlorinator usually fail to raise residuals above 0.2 p.p.m. The residual immediately increases following a copper sulphate treatment.

Vacuum cleaners capable of removing leaves are necessary at these pools if a clean bottom and proper residuals are

to be maintained. Except for excessive temperatures and collection of sediment on the bottom it would be possible to operate these pools throughout the season without draining.

GENERAL OBSERVATIONS

Observations of the effect of sand beaches during this study have failed to show any deleterious effect on the water in any way, provided the sand is clean. There is an apparent beneficial effect since in those portions of the pool bordering the sand beach there was less slime on the bottom, due probably to the scouring action of sand carried into the pool by bathers. At Malone Pool, where the sand becomes dirty by flooding during heavy rains, additional turbidity and possibly an increase in chlorine demand resulted.

It was desired to know what, if any, latent disinfecting properties the pool water had, using the chlorine ammonia process. Samples from the Fair Grounds Pool were collected in sterile bottles and taken directly to the laboratory. The residual chlorine test was made at the time and point at which the sample was collected. Plates were poured and tubes sowed for *B. coli* immediately, and following this the sample was inoculated with a known number of *B. coli* in 10 c.c., 1.0 c.c., and 0.1 c.c. Samples were tested each minute for a period of 10 min. and then every 5 min. up to 30 min. (See Table VI.)

As a guide to the use of the ammonia chlorine process during the study and to obtain a comparison of maintenance of residuals by this process as against the use of chlorine alone two determinations of the rate of reduction of residual chlorine in the Malone Pool were made on different days. Orthotolidin determinations were made frequently enough to obtain curves showing the reduction of residual chlorine. (Figure 7.)

SUMMARY AND CONCLUSIONS BASED ON EXPERIMENTAL STUDIES

1. The present studies have included close supervision of, and experimental work on, 3 outdoor swimming pools in Memphis, supplemented by observation of several other pools.

2. The maintenance of satisfactory residuals of chlorine, using chlorine or chlorine compounds alone, has not been found practicable in the pools studied. In recirculation pools, perhaps on account of the long turnover period, there was too great divergence in chlorine residuals between inlets and distant points. In pools requiring hand application of chlorine compounds residuals disappeared rapidly and additional applications during a single bathing period is not satisfactory.

3. The maintenance of satisfactory residuals of chlorine, using chlorine and ammonia, in the 3 Memphis pools studied was found to be practicable. Where recirculation equipment and location of inlets for uniform distribution is provided residuals above 0.2 p.p.m. can be maintained easily. Where recirculation equipment is inadequate or distribution poor residuals throughout the day can be maintained by supplementing machine application with hand application once before the bathing period. Where recirculation is not provided residuals can be maintained throughout the day by a single application of ammonia and chlorine before the bathing period.

4. Hand application of chlorine and ammonia compounds is not as satisfactory as continuous application of chlorine and ammonia by machine. If hand application is the only method available a high test chlorinated lime and a technical grade of ammonium sulphate were found to be satisfactory. In such cases it is necessary to dose for high residuals at the time of application in order that adequate residuals will remain throughout the bathing period.

5. Experiments to determine relative rates of reduction in chlorine residuals, using chlorine alone and chlorine with ammonia, were made and the results show a much more rapid reduction when chlorine is used alone.

6. The rate of reduction of chlorine residuals is increased by heavy bathing loads, growths of algae, addition of dust or leaves, and any other condition increasing the organic content of the water. The effect of such conditions in causing disappearance of chlorine residuals is very pronounced with chlorine alone and noticeable when chlorine and ammonia are used. Variations in temperature

of the pool water did not have any apparent effect upon the distribution or maintenance of chlorine residuals.

7. Flexibility of design in order to obtain additional reserve capacity in chlorination equipment and immediate distribution through proper design of piping system and inlets to all parts of the pool is emphasized as the most satisfactory method of counteracting unusually high chlorine demands resulting from any cause. A short turn-over period and uniform distribution are also important from the standpoint of appearance of the water, affecting rapidity with which turbidity can be removed from the water itself and also accumulation of material on the bottom in the shallow portions.

8. Bacteriological examinations for total bacteria and *B. coli* have covered ranges of chlorine residuals from 0 to 1.0 p.p.m. In general these results show that between residuals of 0.2 and 0.5 p.p.m. low bacterial counts can be expected, the use of chlorine alone and the chlorine-ammonia combination giving comparable results. Less reliable disinfection, shown by erratic bacterial results, was obtained when chlorine was used alone, and when hand application of chlorine with ammonia was employed. No explanation is offered but at the pool operating equipment 24 hrs. a day no high counts were noted until residuals had dropped to 0.1 p.p.m., while in the case of 2 pools using hand application a number of high counts were found between 0.1 and 0.3 p.p.m.

9. It is assumed from a study of literature and previous experience that the disinfecting action of chlorine alone is more rapid than is that of chlorine-ammonia. Experiments to determine the latent sterilizing value of water containing chloramines were made, the results showing that with residuals of 0.3 to 0.5 satisfactory disinfection is obtained in about 20 min.

10. Complaints of smarting of eyes and irritation of mucous membranes led to the conclusion that higher residuals of chlorine and ammonia can be carried without danger of complaint than with the use of chlorine alone. Hydrogen-ion concentrations were maintained between 7.4 and 7.6, and it is the opinion of the writers that with proper pH control, and the use of chlorine and ammonia no complaints should result from maintenance of residuals as high as 1.0 p.p.m.

11. Clean sand beaches are not detrimental to the quality of pool waters provided spectators are not allowed access to them. Trees, while providing shade, cause trouble due to leaves falling into the pool, affecting the appearance as well as increasing the chlorine demand. Dust is detrimental in that turbidity is added to the water with contamination.

12. Scum gutters are a necessity if a pool is to be kept in satisfactory condition. There is a relatively large accumulation of floating material which collects and does not settle out.

13. The taking of a shower bath before entering the pool is considered essential and use of showers must be made compulsory, as at least 50 per cent of those using the pools will not take them voluntarily. Satisfactory use of showers can be obtained only by proper location, continuous operation, and personal supervision.

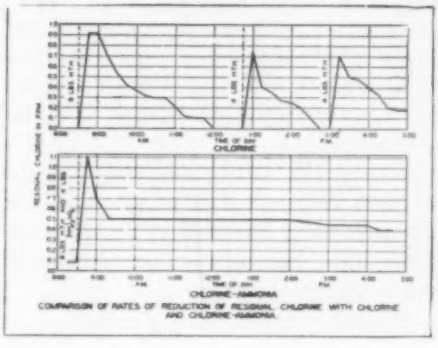
14. From the limited opportunity for observation at Monroe, La., the authors find no apparent public health value in the use of salt over fresh water. However, one of the authors who suffers from hay fever every year experienced a decided relief after swimming in the municipal salt water pool at Monroe. The cost of using saline water in a pool is considered impracticable if salt has to be purchased, but the use of salty well water is practicable if sufficient quantity is available.

APPLICATION TO CONTROL OF SWIMMING POOLS

City—The Memphis swimming pool ordinance allows a period of grace not to exceed 5 years to bring the existing pools up to the requirements. The first year or two is being used by the Health Department to study each pool under actual operating conditions. The ordinance also provides that each pool shall secure each year from the Health Department a permit to operate.

Following each swimming pool

FIGURE 7



COMPARISON OF RATES OF REDUCTION OF RESIDUAL CHLORINE WITH CHLORINE AND CHLORINE-AMMONIA

season, it is planned to arrange for a conference with the owner or operator of each pool and discuss needed improvements for that pool. Following this conference the department will address a letter outlining the required improvements which will be expected before issuance of a permit to operate the following year. These studies will enable the department to insist on practical and intelligent improvements.

As the results of these studies it appears possible to maintain water in a swimming pool which will meet the bacteriological standards for good drinking water. In order to encourage consistently good samples the Memphis City Health Department has adopted a grading schedule similar to that used in Detroit, Cleveland, and Cincinnati, announcing 4 times during the year the rating of all pools, based on the quality of the water as shown by bacteriological tests. The concern shown by each pool following the first grading announcement which did not reach a 900 to 1,000 rating, classed as "A," demonstrated that in future ratings, practically every pool will probably be in class "A" rating. Ratings have been announced 3 times to date. Each rating was based on the percentage of good portions tested multiplied by 10, a good portion being one with a total bacteria count below 200 or a negative partially confirmed test for *B. coli* in 10 c.c.

It is believed that these studies will be of value in coöperating with architects and engineers in the design of new pools, or in making major changes and in the approval of plans for construction submitted to the City Health Department under the provisions of the ordinance.

State—The study and experimental work at Memphis has furnished a guide which is most valuable in the formulation and execution of a state-wide swimming pool program.

A state program should include:

A sound educational program

Advice to local health authorities in regard to legislation and procedures

Advice directly or indirectly to pool operators

Collection of data through surveys or submitted reports as a basis for judgment regarding the extent to which the state health department can afford to go in a state-wide swimming pool program

Education of the public should proceed along the lines that will create an understanding of the necessity of swimming pool control and of patronizing those pools which produce a satisfactory water and maintain the pool and appurtenances in a manner which meets the requirements of state or local regulations in every respect.

The state department of health must be in a position to give expert advice to the local health authorities in drawing up swimming pool regulations, formulation of a swimming pool sanitation program and general advice in regard to operation.

The result of this study provided the department with additional data upon which advice to engineers and architects can be based, particularly regarding recirculating equipment required and inlet design. One problem of pool design which has given considerable trouble is the irregular distribution of chlorine, particularly when fed by machine with inadequate recirculating equipment and improper spacing and design of inlets. Clarity of pool waters has been a problem in a number of pools, especially those subject to heavy bathing loads and where insufficient filter capacity is provided.

Sound advice to the operators of pools is most important, because the quality of a pool water is directly dependent upon operation. Some supervision is necessary along with instructions for proper disinfection, orthotolidin tests, proper alum dosage, proper copper sulphate dosage, time interval between washing the filters, use

of the vacuum cleaner and application of soda ash if required. Operators of pools having inadequate or no equipment have a more difficult problem to maintain a good water and more attention must necessarily be given to operation of this type of pool.

The active participation of the state department of health in promoting swimming pool control programs should lead toward standardization throughout the state and make the individual programs of various cities comparable.

GENERAL SUMMARY

The historical outline of the growth of swimming pools dates from 312 B.C., while the early development in purification of swimming pools in the United States dates from 1906. The interest in disease transmission in pools seems to have aroused very little attention until 1915. In the development of a state and municipal swimming pool program, certain problems were encountered.

Beginning in 1930 a swimming pool program was initiated in Memphis. A survey of the situation was made and other cities were visited and their programs observed. A coöperative arrangement between the city and state was made to study the problem jointly. A swimming pool ordinance was finally passed in July, 1931, and a program of systematic supervision of all pools was instituted.

Between the years 1909 and 1926, 19 pools were built in Memphis. Thus a multiplicity of designs and problems were presented and it was found necessary to make a special intensive study of 3 general types before intelligent progress could be made in a practical program. Experimental studies were made and certain conclusions were reached. In addition to the pools in Memphis, limited information was gathered on a salt water pool and observations made on 2 newly constructed pools in Tennessee. Following these studies it has been possible to indicate certain applications to municipal and state swimming pool control programs. This presentation and discussion are given hoping that they may be of some value in other places.

REFERENCES

1. Shaw, Frank R. Swimming Pool Sanitation, *Municipal Sanitation*, June, 1931.

2. *Weekly Health Review*, Series 2, No. 15, Detroit Department of Health, week ending April 12, 1930.

3. Reports of The Joint Committee on Bathing Places, American Public Health Association and Conference of State Sanitary Engineers. Reprint from *A. J. P. H.*, 1930.

Injuries Produced by Contact with Electric Circuits

AN extensive article summarizes earlier studies, the various factors provoking electrical mishaps, the ascertained cause of death and the effects upon the nervous symptoms, the heart, the blood pressure, the skin, musculature, blood vessels, and other less important points of localization.

Under several of these headings, the authors report their own findings, principally upon rats, but also some autopsy findings on 2 men who were electrocuted. There are also brief resumés of the subject of treatment and of permanent disability. The general impression should be corrected that low voltage cricuits need no precaution. "A time has come when it is important to give wide publicity to the possible dangers. The sale of poorly insulated electrical devices for the home should be prohibited." A bibliography of recent articles follows.—Orthello R. Langworthy and William B. Kouwenhoven, *Am. J. Hyg.*, 16, 3:625–665 (Nov.), 1932. E. R. H.

Risk of Persons in Familial Contact with Pulmonary Tuberculosis*

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DURING the past 2 years various workers in this department have collaborated in two epidemiological studies of tuberculosis; one concerned with the families of children registered in Dr. Edwards A. Park's clinic for tuberculous children at the Johns Hopkins Hospital; the other a series of studies carried on by a special unit of the State Department of Health of Tennessee in various localities in that state. The several studies have varied in scope and in certain details of method, but a purpose common to all of them has been to ascertain the mortality and specific morbidity in familial contacts of persons suffering from pulmonary tuberculosis, for comparison with the experience of suitable control populations.

The data so far accumulated are not sufficient to be of much significance as actual measures of even the gross average risks. They are sufficient, however, to afford material for preliminary investigation of the antecedent question whether records of the kind represented are at all suitable for the purpose in view. It is to this question that the present discussion is directed, the actual records of a small group of families being introduced only for purposes of illustration.

For the acute communicable diseases, such as diphtheria, scarlet fever, and measles, measurement of the morbidity risk of familial contacts is a simple procedure, because the excess risk is concentrated within the few weeks following invasion of the household. As was pointed out by Chapin years ago, all that is necessary is to ascertain, in each invaded household, the number of persons present, other than the one first attacked, with particulars as to sex, age, and many other variables which are to be considered; then to ascertain the number of cases of the same disease subsequently occurring in the various exposed groups within a stated period of, say, 4 to 6 weeks. This attack rate may then be compared with the average rate in the community at large for a like period of time. Collection of the data is simple because, for any family, the required period of observation is brief; and compilation is simple because the period to which the attack rate refers may be taken as the same for all families.

For tuberculosis the requirements are essentially the same, but are more difficult to meet, chiefly because the disease is of slow evolution, and we cannot assume that the risk with which we are concerned is concentrated within the year or even the decade following establishment of the known exposure. It may, perhaps, be manifested by excessive morbidity or mortality in any

* Read before the Epidemiology Section of the American Public Health Association, at the Sixty-first Annual Meeting in Washington, D. C., October 25, 1932.

subsequent period of life. Hence, observation of the exposed group must extend over a sufficient number of years to define the rates of morbidity and mortality prevailing in successive periods throughout the usual span of life. To keep a sufficiently large group of people under systematic, exact observation for such length of time is a difficult task which has, indeed, been undertaken in various places, but to the best of my knowledge has not been carried much beyond a decade. However, such simple facts as lie within the knowledge and memory of the average householder may be obtained by *retrospective* investigation, tracing familial histories backward into the past. The procedures followed in a preliminary attempt to apply data collected in this way and to check their reliability may be described best by referring to a concrete example.*

The available records which best serve the purpose of illustration are from a survey of the negro population of Kingsport, Tenn., made during 1930 and 1931 by a special unit of the Tennessee State Department of Health.†

The survey covered 132 families, constituting practically the entire negro population of the city.‡ For each family the investigation included a detailed familial history, extending as far back as practicable, and examination of every present member in a special clinic, where the routine procedure was: physical examination, roentgenogram of the chest, and tuberculin test. With very few exceptions, the full schedule of examinations was carried out for all persons, regardless of whether or not there was any reason to suspect tuberculosis.

In addition to numerous other items which do not come into the present discussion, each family schedule gave the following:

1. Date of establishment of the household, which may be defined more exactly as the date when the present head of the household came into that position. This is an important item, as it marks the date from which at least one informant may be expected to have first-hand knowledge of occurrences within the household.

2. A list, by name, of all persons present in the household when the schedule was made out, giving, for each person: familial relationship, date of entrance into household, age at time of investigation, record of any present or past illness diagnosed as certain or probable tuberculosis, record of clinic examination, and a detailed account as to time and circumstances of any known household contact with antecedent cases of pulmonary tuberculosis.

3. A list, by name, of all former members of the household, giving, for each: age at which entered the household, record of known or suspected tuberculosis while in the household, record of household contact with antecedent cases of phthisis; age at which withdrawn from the household, status when withdrawn—whether living or dead—and, if dead, date of death, with ascribed cause.

These records were made with great care, each family being revisited as often as necessary to check and complete the information; and as the families were thoroughly coöperative, it is believed that the facts within their knowledge were stated with fair accuracy. From the histories obtained, it is probable that the deaths ascribed to pulmonary tuberculosis actually were due to that cause; but it is by no means certain that these were all the deaths attributable to tuberculosis, and as to non-fatal cases of this disease the histories, both negative and positive, obviously are subject to considerable error. Also, the *early* history of *former* members, who were born outside of the households in which they were recorded,

* The procedure, except in collection of data, would be essentially the same in analysis of records obtained by keeping a group under planned observation.

† It is expected that a detailed report of the studies in Kingsport will be made from the State Department of Health of Tennessee.

‡ The federal census of 1930 gives the negro population of Kingsport as 596. The persons living and present in the families surveyed numbered 556. Only 3 families are known to have been omitted (because of unwillingness to be examined), but it is probable that a few others may have been missed.

must often be unknown. However, in general, the facts are simple and, for the period since establishment of each household, presumably within the knowledge of the informant.

The whole group of 132 families furnished records of 794 present and former members, classified as follows:

(1) Living and present at time of survey		556
(2) Former members of same households, not present at time of survey		
(a) removed, living	142	
(b) dead, (27 of tbc., 69 of other causes)	96	
		238
Total: present and former members		794

Before discussing mortality and morbidity from tuberculosis as related to history of known household contact with the disease, it is desirable, as a description of method and a check of the data, to compare the mortality from all causes in the entire group with the current mortality in the negro population of the state as a whole. The force of mortality in the population of the state is expressed in terms of the annual death rate, that is, the ratio of deaths to persons under observation for a period of 1 year and, since this rate varies widely with age, it is necessary for significant comparisons that it be stated separately for each age group. We need, therefore, to reduce the mortality of the Kingsport families to these same terms, namely, age-specific annual death rates. To accomplish this, it is necessary to convert the observations on the family group to terms of life-experience, of which the unit is 1 person under observation for 1 year, or 1 person-year. The procedure to this end, which is an application of the familiar principles of life-table construction, is illustrated in Table I, which shows in detail the summation of life-experience within the age-limits 0–5 years.

As indicated in this table, 363 children, born in the families to which they are allocated, came under observation at the beginning of the first year of life. Of these, 18 died within their first year, and 15 others were less than 1 year old when the record was taken, so that a total of $18 + 15 = 33$ were withdrawn from observation before completing the year. Counting each person withdrawn before the end of the year as having been in the household ½ year, we have as the aggregate

TABLE I

SUMMATION OF LIFE-EXPERIENCE AND MORTALITY BETWEEN THE AGE-LIMITS 0–5 YEARS IN 132 NEGRO FAMILIES

Year of Age x to x+1	*Number present at beginning of year* l_x	*Number added during year* n_x	*Number withdrawn (living) during year* w_x	*Number dying during year* d_x	*Mean number present during year* L_x	*Death rate per 1,000 during year* m_x
0–1	363	0	15	18	346.5	51.9
1–2	330	3	3	4	328.0	12.2
2–3	326	3	16	6	316.5	19.0
3–4	307	4	12	0	303.0	....
4–5	299	5	14	3	293.0	10.2

The derivatives from the primary figures (l_x, n_x, w_x, d_x) are:

$l_{x+1} = l_x + n_x = w_x - d_x$.

$L_x = l_x + \frac{1}{2}(n_x - w_x - d_x)$.

$m_x = \frac{1000.\ d_x}{L_x}$

TABLE II

MORTALITY FROM ALL CAUSES, BY AGE, IN NEGRO FAMILIES OF KINGSPORT, FROM DATE OF ESTABLISHMENT OF EACH FAMILY TO DATE OF EXAMINATION, AND MORTALITY RATES IN NEGRO POPULATION OF STATE, 1920

	Negro families of Kingsport			*Negro population of Tennessee.*
Age	*Person-years of life-experience*	*Deaths, all causes*	*Annual Death rates per 1,000*	*Death rates per 1,000, 1920* *
Under 1	346.5	18	51.9	120.0
1–4	1,240.5	13	10.5	14.0
5–9	1,259.0	7	5.6	4.0
10–19	1,916.5	17	8.9	7.1
20–29	2,190.5	15	6.8	15.0
30–39	1,557.5	13	8.3	17.0
40–49	764.5	1	1.3	17.4
50–59	308.5	8	25.9	26.1
60+	88.0	4	45.5	67.0
Total	9671.5	96	9.9	18.0

* From U. S. Mortality Statistics, 1920.

of life experience between the age-limits 0–1 year, $363 - 33/2 = 346.5$ person-years.

In the second year of life, we begin with 330 (363 — 33) children remaining under observation from the preceding year; and during the year 3 new children are added, while 7 are withdrawn. Allowing ½ year as the mean time spent in the household for each newly added person and each one withdrawn, the total life-experience in the second year, between the age-limits 1–2 years, is $330 + \frac{3 - 7}{2} = 328$.

In the same way, taking account of all additions and withdrawals, the life-experience in each successive year is summed up, until we have entered in the table a total of 378 individuals—the 363 present at birth plus 15 added at various times—of whom 91 have been withdrawn before reaching the age of 5 years, 31 by death and 60 for other reasons. In terms of person-years, where the unit is 1 person observed for 1 year, the aggregate life-experience between the age limits 0–5 years, is the sum of the five L_x values in the table, namely, 1,587 person-years. Within this experience 31 deaths occurred, hence the *annual* death rate between the age-limits 0–5 years is: $31/1{,}587 \times 1{,}000 = 19.5$ per 1,000.

Table II, constructed by continuation of the process illustrated in Table I, shows the entire-life experience of the 794 present and former members of the 132 families at successive ages from infancy to old age. The aggregate is 9,671.5 person-years; and in each age class except the oldest, the experience comprises several hundred person-years. Opposite each age-group are set the deaths which occurred at that age, and the next column gives the annual death rate per 1,000 in the age class, calculated as the ratio of deaths to person-years. The last column shows, for comparison, the annual death rates at corresponding ages in the negro population of the state in 1920.

The death rates in the Kingsport families are approximately equal to those in the negro population of the whole state in the age group 1–19 years, and at ages over 50, but are very much below the state experience in the first year of life, and in adults aged 20–49 years. The low infant mortality in the Kingsport families is probably

TABLE III

MORBIDITY AND MORTALITY FROM TUBERCULOSIS IN NEGRO FAMILIES, KINGSPORT, BY AGE, TOGETHER WITH MORTALITY IN THE NEGRO POPULATION OF THE STATE, 1920

Age periods	Life-experience Kingsport families person-years	Cases of tuberculosis † Number	Cases of tuberculosis † Attack rate per 1,000	Deaths from tuberculosis: Kingsport families Number	Deaths from tuberculosis: Kingsport families Rate per 1,000	Negro population of State rate per 1,000 *
Under 1	346.5	2	5.8	1	2.9	2.8
1–4	1,240.5	2	1.6	1	0.8	1.1
5–9	1,259.0	5	4.0	2	1.6	0.7
10–19	1,916.5	19	9.9	8	4.2	2.2
20–29	2,190.5	17	7.8	7	3.2	5.8
30–39	1,557.5	18	11.6	4	2.6	4.0
40–49	764.5	6	7.8	1	1.3	2.8
50–59	308.5	4	13.0	2	6.5	3.0
60 & over	88.0	4	45.5	1	11.4	3.7
All ages	9,671.5	77	8.0	27	2.8	3.1

* From U. S. Mortality Statistics, 1920.
† Cases classed as "suspected" make up about one-third of the total.

due in part to the fact that the standard of living of the negroes in that city was well above the average; but it may be attributable in part to failure of informants to note some of the deaths of infants at very early ages, this being an error not unlikely to occur. The low mortality in adults aged 20–50 can hardly be attributable to any similar error. It more probably reflects the selective character of the life-table experience, which, being made up from the records of persons residing in established families, largely excludes certain classes of young adults suffering excessive mortality, namely, married couples of which both members have died young, residents of institutions, vagrants, and transients. With due regard to these considerations and to the small number observed, the agreement between the Kingsport mortality record and state-wide experience is close enough to indicate that the familial records are not grossly erroneous. At the same time, it needs to be clearly recognized that in certain important respects the method employed is selective with respect to mortality.

The 132 families furnished records of 27 deaths ascribed to tuberculosis. In addition to these, the clinic examinations revealed 50 more or less definitely diagnosed cases of pulmonary tuberculosis in living members of the families, making a total of 77 cases living and dead.* Distributing these 77 cases according to age at onset of illness—as nearly as this could be ascertained—and distributing the fatal cases according to age at death, age-specific annual morbidity and mortality rates are derived as shown in Table III, which also shows corresponding death rates in the negro population of the state. It will be observed that the tuberculosis mortality rates are very similar to those prevailing in the state at large, and that the morbidity rates, though much higher than usually shown in official records, are reasonable in relation to the mortality.

The foregoing tables of mortality and

* A majority of the 50 cases recorded in living members were judged to be inactive at the time of examination, and of these a considerable proportion were classed as "suspected." A reëxamination of the suspected cases, which is now in progress, indicates that some 10 to 15 of this group may eventually be classified as negative, making a proportionate reduction in the morbidity rates of Tables III and IV.

morbidity in the whole group of families have been included only to illustrate the data and methods used and to check the reasonableness of the results (as to mortality), by comparison with current experience in the negro population of the state at large. We come now to the question of morbidity and mortality in familial contacts of known cases of tuberculosis.

Of the 794 persons included in the study, 299 gave a history of having been, at some time, in household contact with a case of certain or probable pulmonary tuberculosis. The mortality and morbidity rates in these known "contacts" subsequent to their exposure have been calculated by making up a life-table in which each contact is entered only for that period of his residence in the family after the known household exposure began, recording against this experience the subsequently observed mortality and morbidity.* As a control, a similar table has been made, dating from entry into the household, for all persons who gave no history of known household contact, plus the preëxposure experience of those who came into household exposure subsequent to entry into the family.

When the population is thus subdivided, the numbers upon which age-specific rates must be calculated become so small that for significant comparisons it is necessary to summarize the results. For this the most convenient form is a statement of annual morbidity and mortality rates at all ages, adjusted to a population of standard age-distribution. The comparisons made on this basis, in Table IV, indicate that the persons with a positive history of household contact suffered thereafter tuberculosis morbidity and mortality rates about double those of the control population, and in addition, suffered a materially higher mortality from other causes.

TABLE IV

MORBIDITY AND MORTALITY IN RELATION TO HISTORY OF FAMILIAL CONTACT WITH PULMONARY TUBERCULOSIS. NEGRO POPULATION, KINGSPORT, TENN.

	Contact history	
Basis of Comparison	*Positive*	*Negative*
Person-years in classification	2,199	7,472.5
Cases of tuberculosis: number	26	51
annual attack rate per 1,000	12.9±1.7	6.8±0.64
Deaths from tuberculosis: number	10	17
annual death rate per 1,000	4.6±1.01	2.3±0.38
Deaths, all causes: number	28	68
annual rate per 1,000	12.8±1.62	9.2±0.67

All morbidity and mortality rates adjusted to age-distribution of the entire life-experience in the whole group of 132 families.

The figures given in Table IV show only the *average* morbidity and mortality risk for all familial contacts in this group of families, as measured by comparing their morbidity and mortality rates with those of a control drawn from the same universe. Given sufficiently extensive and exact data, it would be quite possible, by similar processes, to measure the variations in this risk as related to numerous circumstances which presumably are of importance, as, for instance, the age at which exposure first took place, its

* Where the known exposure occurred before entrance of the individual into the household in which he is listed, the post-contact life-experience is dated from entry into present household.

duration, the activity of the case to which the individual was exposed, parental history, etc. The number of persons included in this particular set of records is too small for such subdivisions as these more detailed studies would require and, indeed, is so small that no special significance should be attached to the result given as a measure even of the average risk to contacts in negro families. It is, however, of interest to note that the relative rates of mortality in the contact and control groups, respectively, are in reasonable agreement with the observations of Weinberg (1913, pp. 123–129) who, in his extensive study found that the children of tuberculous parents suffered rates of mortality (at ages under 20 years) from all causes about 1.28 times and from tuberculosis about 2.16 times the rates prevailing in the community at large.

It should perhaps be added, though it is sufficiently obvious, that in the procedure applied here, no attempt is made to distinguish between the risk resulting directly from exposure and that which may be due to constitutional weakness or generally unfavorable environment. These questions may be approached by the same general method, but require much more extensive data.

The method which has been described is in no sense new in its application to studies of tuberculosis. It has been used by Elderton and Perry, in their studies of the mortality of persons treated in sanatoria; by Weinberg, in his excellent and extensive study of the mortality of children born of tuberculous parents; and by others. It appears, however, to have been applied little, if at all, to retrospective records of the kind here discussed; and since it is records of this character which are most readily available from the experience of public health organizations and clinics, it has appeared worth while to call attention to this general method for the study of material which at present too often remains unassembled.

REFERENCES

Elderton, W. P. and Perry, S. J. *Studies in national deterioration. VI.* A third study of the statistics of pulmonary tuberculosis, etc. Drapers' Company research memoirs, Cambridge Univ. Press, London, 1910.

Studies in national deterioration. VIII. A fourth study of the statistics of pulmonary tuberculosis, etc. *ibid*, 1913.

Weinberg, Wilhelm. *Die Kinder der Tuberkulösen.* S. Hirzel, Leipzig, 1913.

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Medical Examination of Domestic Servants*

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IN modern government the state has assumed the responsibility for the care of the indigent sick and has broadened many curative activities into real preventive measures. Thus we do not wait for epidemics to develop as a result of sewage contamination of our water supplies, or for cases of food poisoning to result from sophisticated or adulterated foods. The requiring of clean water, milk, and food supplies is as much a preventive activity as are the definitely preventive measures against diseases by inoculation or vaccination. It is such efforts to promote health that have called for the extension of safety devices into wider and wider channels of governmental control.

It required the wide public interest of the "Typhoid Mary" story to show the danger to individual households of an undetected typhoid carrier employed as a cook. The result of this publicity was the adoption by the New York Health Department of a requirement for the medical examination of food handlers. Dr. Louis I. Harris, the Health Commissioner, after 2 years' experience, made the following significant statement:

> It is only a beginning, but one whose significance and ultimate possibilities may well be called impressive. The manifold benefits that may ultimately accrue from this system must be left to the imagination of those who have glimpsed the possibilities of preventive medicine and especially of adult hygiene and periodical medical examination.

EXAMINATION OF FOOD HANDLERS STARTED IN 1920

This work, so well begun in New York, was adopted by Newark, N. J., in the middle of 1920, and since that time 150,000 examinations of food handlers have been made. The conditions encountered were tuberculosis, venereal disease, skin diseases, and various purulent conditions of the mouth, ear, and nose. During the 11 years the examinations have been carried on by the Newark Department of Health, there has been little or no opposition by the owners of restaurants and eating places, and we have received the full coöperation of the various labor unions. Even among the employees themselves it is not considered a hardship. The law acts as a bar to the employment of the sick and diseased, who would compete by accepting lower wages and longer hours.

Although the findings of the examinations for 11 years in Newark indicate that contagion is not more prevalent among the food handlers than any other body of industrial workers, the evidence gathered in the first few years showed that many were being employed when in the infective stages of tuberculosis. That this condition has been entirely

* Read before the Health Officers Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.

eliminated is due undoubtedly to the semi-annual examination of food handlers. Skin diseases are rarely found among applicants; venereal diseases in the contagious state are frequently found.

There was observed even in the first few months of the procedure a remarkable improvement in the general appearance of food handlers. There was a more wide-awake and intelligent appearance in all of them, due evidently to the elimination of the cheap labor of diseased persons previously engaged in other occupations who had sought the lighter and more elastic hours of restaurants and lunch counters. This is particularly important among the food-handling class for the reason that many are part-time workers, frequently recruited from married women and mothers of families who have some part of the day at their disposal.

SINCE 1930 DOMESTIC EMPLOYEES HAVE BEEN EXAMINED

The situation with regard to food handlers being adequately taken care of, the attention of the department was directed to the number of domestic employees attending the various clinics of the City Dispensary. Many of these were listed as tuberculous; others as suffering from venereal diseases in various stages of infectivity. The domestic servant by the nature of his or her employment was considered to be even more directly in contact with the family circle of the householder than the restaurant food handler. Some of them, such as nurse maids, take care of very young children, and their freedom from contagious disease is a matter of supreme importance. Others, such as cooks, waitresses, maids, laundresses, and chauffeurs, have not so direct contact with individuals, but none the less it is important to the family that no contagious diseases should exist among them.

TYPE OF EXAMINATION

The ordinance requiring the medical examination of domestic employees was passed in September, 1930. It requires all domestic employees to file with the Department of Health a certificate from a duly licensed physician setting forth that such persons are free from tuberculosis, and any other contagious or communicable disease. The certificate has to be made upon blanks supplied by the department, and is good for a period of 6 months. Provision was made for a free examination at the department clinics. After the examination a domestic servant's card is issued bearing a photograph of the applicant. The penalty for failure to comply is a fine of $25 for the first offense and $50 for the second. Both the domestic and the employer are liable under the law for any violation of the ordinance.

The number of domestics employed in Newark, according to the U. S. Census for 1930, was: males, 3,864; females, 9,674; total, 13,538. The group included under hotel and restaurant help are food handlers generally and are not purely domestic in nature. It was considered that the census figures overstated considerably at this time the number of individuals employed in the domestic group. This was verified by a house-to-house canvass of the residential districts, where it was found that owing to the business depression families were either doing without domestic help or had considerably reduced the number of servants employed.

The enforcement of the domestic servants ordinance was placed in the division of sanitation. The actual examinations are conducted in the dispensary clinics under the supervision of the bureau of tuberculosis. The form of examination carried out is similar to that for food handlers, and includes examination of the skin to detect diseases such as eczema, psoriasis, abscesses, cuts and wounds. The at-

tention of the examiner is directed to the possible association of skin diseases with syphilis. When such is suspected, a Wassermann blood test is required.

The examination of the chest must include all known procedures for the determination of chronic pulmonary diseases. Any abnormal chest condition found is sufficient cause for rejecting the applicant pending X-ray or fluoroscopic examination.

The examination of the nose, mouth, teeth, throat, ears, and eyes is directed toward the discovery of acute or chronic conditions of an infectious nature. Especially where there is a discharge, swabs are taken for examination.

Blood tests are required where there is a history of typhoid fever or syphilis. When there is no scar, vaccination against smallpox is required.

In the examination for venereal disease in the case of males a routine inspection of the sexual organs is required. Where suspicious sores or discharges are present, swabs are taken for dark-field examination and blood for a Wassermann. For women, there is required a statement from each applicant of freedom from venereal disease.

DOMESTIC EMPLOYEE'S CARD

After examination the applicant, if approved, takes the history card to the sanitary division, where a domestic servant card is issued bearing a photograph of the individual. Where there is doubt as to diagnosis for any reason whatsoever, the applicant is given a reëxamination slip and a temporary card. This is usually for a week or a month. When an applicant is rejected the physician notifies the sanitary division, which in turn notifies the employer and employee in writing. The cause for the rejection is never given to the employer.

As is the case with all new laws, a considerable amount of education and publicity was required. All employment agencies, public and private, were brought into the department for a conference. The new ordinance was explained and it was pointed out that no domestic employee should be placed in any position without possessing the domestic employee's card. Local newspapers carried copies of the new ordinance displayed above help wanted advertisements. Domestics advertising for places were mailed copies of the law with instructions for examination. All hotels, clubs, lodging houses, and institutions were canvassed and their domestics sent down for examination. A house-to-house canvass was carried out in the residential districts and all householders were duly informed of the new ordinance.

During the year 1931 the law was not generally known to the public and the follow-up system had not been sufficiently organized. More definite efforts in the early part of 1932 produced better results. The number of examinations to date follows. It will be observed that there were over 10,000 examinations during first 8 months this year compared to 2,863 during 1931.

EXAMINATIONS

	Private Doctors	*At Our Clinic*	*Total*
1931	291	2,572	2,863
8 Months, 1932	1,282	8,879	10,161

INFECTIONS FOUND

As a result of clinical examinations and a check-up of domestics attending the venereal disease clinics the following figures were obtained: syphilis in all forms 115, positive Wassermann 52, negative Wassermanns 63. Among the group found infected with syphilis 66 were day workers, the remainder domestics in various lines of employment.

There were 39 cases of skin diseases reported. These included impetigo, scabies, seborrhea, acne vulgaris, psoriasis, and purpura.

Among the 34 cases of tuberculosis found 14 discontinued work, 8 moved and could not be traced, 5 were sent to sanatoria, 4 in arrested stage were allowed to work, 1 died, 1 worked outside the city, 1 left for his home in the South; 25 were colored and 9 white.

The Newark ordinance did not specify that the domestic suffering from a contagious disease had to be in the communicable stage to be excluded from employment. It is assumed, however, that this was the intent of the ordinance, and therefore domestics with arrested tuberculosis or with venereal disease in a non-communicable form are allowed to continue in their occupation. With regard to those with diseases in the communicable state, the applicant is refused permission to continue in employment and the employer so informed. The department follows up all applicants who have been found infected, to see that proper treatment is being carried out. By the city ordinance we cannot divulge the nature of the disease to the employer. This is better for the self respect of the domestic and insures greater effort in bringing about proper and continuous treatment.

A PRACTICAL METHOD OF SAFEGUARDING THE FAMILY

I am asked repeatedly, "Is the examination of food handlers and domestics possible for small communities in the light of the cost for specialized service?" The answer will depend upon whether a complete medical examination is contemplated, as in the case of life insurance companies, or an examination for contagiousness only. If the latter, the necessary examination is not so extensive and can readily be carried out by a well equipped physician in a few minutes for each applicant. Blood tests and X-ray work will require of course longer.

Routine Wassermanns and X-ray examinations are not made as yet unless symptoms indicate their necessity. Among certain groups of domestics, such as the day workers, the taking of a routine blood test might be of advantage. In fact, we are to start making Kline tests in certain groups of domestics within a few weeks, as our Law Department is of the opinion that it is satisfactory, providing applicant signs a routine permission form. The same may be said of the need for a mental or intelligence test. This might be a good procedure for those in charge of babies and children when quick thinking is sometimes a necessity to avoid accidents or the doing of things that might be hazardous to the lives of little ones. From the venereal disease standpoint, vaginal smears are to be taken from this particular group of baby nursemaids.

From the viewpoint of preventive medicine, there can be little doubt that the examination of food handlers has served as a useful and continuous aid in our campaign for cleaner foods. Its extension to domestic employees seems a well worthwhile activity, having as its object the exclusion from the homes of our people of those with contagious diseases.

Sunlight and Health*

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THE heretic Pharaoh Akhnaton, about 3,290 years ago, insisted that there was only one God, one source of all goodness and life, the Sun. He has had many successors and he was doubtless preceded by religious worshippers of light or heat from the Sun. His disciples are found among the heliotherapists today and it behooves us to speak cautiously when in the presence of such enthusiasts.

We know that sunlight was used in the treatment of disease by Hippocrates at Cos, and by the Priests of Aesculapius at Epidaurus. The interest of modern medicine with the use of light in treating disease began seriously with the work of Finsen in 1893, who cured lupus by localizing the light rays of the sun, after filtering out the heat rays. It is by raising the local and general resistance, not by destroying the tubercle bacillus in the skin that ultra-violet rays cure lupus. Ten years later (1903), Rollier started his sunlight treatment of surgical tuberculosis in Switzerland.

The relation of the lack of sunlight to the etiology of disease was first described by Palm, an English physician, in 1890, when he attributed rickets to insufficient sunlight, noted the seasonal incidence of the disease, and described its prevention and treatment by the use of sunlight.

An abundant literature has developed on the known and imagined relationships between sunlight and health and mortality, and the therapeutic application of part or all of the radiant energy of the sun in preventing and treating symptoms and persons.

As a factor in the environment of man, of the deepest and probably, biologically speaking, most ancient significance, sunlight as the indispensable cause of the growth of green plants, and as a condition without which man cannot retain health or continuously reproduce his kind has an importance which increases steadily with man's persistent complication of housing in the interest of his physical comfort and convenience.

May I assume that you are at the moment less concerned with light as a resource in the treatment of disease, than in evidence or accepted opinion as to the preventable conditions resulting from too much, or not enough, sunlight.

Excess of sunlight is known to cause two types of disturbance, physical lassitude, and nervous irritability, the former apparently due to the heat, the latter to the light radiations particularly. Insolation or "sunstroke" may be produced by excessive heat in the absence of sunlight.

In southern Arabia, in our own deserts, and in the tropics of several continents, man's survival has always depended upon his sheltering himself from the heat of the sun, even when his skin is by adaptation capable of pro-

* Read at a Joint Session of the Public Health Engineering and Industrial Hygiene Sections of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

tecting him against the over-stimulation of the light rays. In temperate climates, the injudicious sudden or extreme exposure of white skinned persons, especially of children and thin blond persons, to midsummer sun, even when not to a degree to cause sunburn or to damage from heat, not uncommonly causes irritability, sleeplessness, loss of weight, and a variety of nervous phenomena of similar character. Snow blindness from excess of ultra-violet light and its reflection may follow excessive exposure to sunlight in high altitudes in any climatic belt.

In the treatment of surgical tuberculosis in white skinned people the benefit seems to be in proportion to the pigmentation of exposed skin.

Insufficient sunlight, which we can fairly assume need not, or does not, occur ordinarily in the tropics, but is common at part or all times of the year in temperate or polar regions, is responsible for only one clearly defined clinical entity, rickets.

The cause of rickets in its full complexity is not yet known, but it appears that the growing child from the antenatal period to the age of 2 to 3 years cannot accomplish sound development of bone unless the calcium and phosphorus metabolism has the benefit of the stimulation which sunlight gives to the ergosterol in the skin cells.

The small amount of ultra-violet radiations that penetrates the ozone of our atmosphere is apparently indispensable to the normal development of bone of man and other mammals, unless its equivalent is artificially supplied by other means (cod liver oil, radiated oils, egg yolks, etc.).

Nothing is plainer in the morbidity and mortality experience of our northern cities than that the presence of rickets contributes heavily to sickness and death from bronchitis and pneumonia in young children, to lowered resistance to measles, whooping cough, and tuberculosis, and more remotely, by reason of pelvic deformities, to maternal deaths from difficult, instrumental, or operative deliveries. A further serious by-product of rickets is the disturbance of dentition, and a greater susceptibility to caries and malocclusion of the jaws. Spasmophilia is another condition closely related to rickets and due to insufficient sunlight for healthy infancy. It is to be remembered that rickets is a general metabolic disorder affecting other tissues than the growing ends of the bones, particularly the voluntary musculature and the blood.

It may well be that the growth and development of children and adults suffers disadvantage from insufficient sunshine or skyshine in other still unrecognized ways, but at least there is no other disease entity now described which is believed to be due to such insufficiency. Wise feeding alone will not prevent rickets in the absence of sunlight unless a substitute for solar radiation is added. The same action that determines the prevention of rickets is seen to act in assisting the repair of bone, whether this be in the callus of a fracture or in a bone diseased with tuberculosis.

There are psychological values in sunshine well recognized in the treatment of disease, and particularly in the management of chronic and convalescent patients, and it may fairly be assumed that the delight in the presence of sunlight, indoors and out, from infancy to old age, which is quite universal, is based on physiological benefits, whether they be because of warmth, dryness, ease of work, wider range of pleasures, range of color and form to delight the eye, or the feeling of euphoria that mankind gets from having his place in the sun. Sunlight assists in the healing of wounds on the surface of the body, relieves some of the pain of damaged tissues, and im-

proves the bactericidal properties of the skin in and about the wound.

Apart from these subjective, personal, bodily and spiritual relations of sunlight to health there are the objective or environmental effects of sunlight upon which some of man's safety from his biological enemies depends.

Sunlight and skylight in proportion to their intensity and duration will sterilize surfaces exposed to them, and will even penetrate with bactericidal effect into the unbroken skin, only a fraction of a millimeter in the normal blood-filled tissue, but as far as 4.25 mm. into the skin made anemic by pressure.

This bactericidal effect, which is greatly reduced when radiations must pass through ordinary window glass obliquely into a room, is by a direct action on the cells, and not by the intermediate development of hydrogen peroxide or other chemical, and it is due to the photo-chemical capacity of the cell to absorb ultra-violet rays. In addition to this effect bacteria may be destroyed by the dehydration and oxidation caused by the heat rays of the sun.

Perhaps the most important problem of environment in city housing in northern climates is provision for sufficient light, direct or diffused, from sun or sky, to maintain reasonable sanitation of rooms and halls through the disinfectant property of light, which if not hindered by curtains and dirty glass will accomplish much to reduce viability and virulence of the common human pathogens.

Cloudiness, fog, smoke, or dusts, or combinations of these reduce radiant energy of sunlight below a point safe for the sanitation of the home or for the growth and development of infants. The main factor in determining the effectiveness of ultra-violet solar radiations in benefiting human health is the thickness and quality of the atmospheric envelope and the angle of incidence of the rays. Sunlight is much less controllable for selective therapeutic effect than are artificial radiations under many urban conditions of climate, smoke, etc.

The long red and infra-red rays have effects upon the skin even when they are not appreciated by the eye as light. There has been recent suggestion offered by Leonard Hill of London to the effect that there are selective effects of some of these long infra-red rays coming from an open fire or incandescent gas heater or dark electric radiating heater plate which favorably affect the mucous membrane of the nose and throat by reducing turgescence, and tend to prevent colds. This suggestion will need much confirmation before it can be accepted. Light baths if carried with discretion to the point of erythema may increase general resistance to infection, an effect which can be produced also by heat of various origins, or by a mustard plaster.

There are 3 indices of measurement for therapeutic strength of ultra-violet rays: (a) lethal effect on infusoria; (b) erythema of the skin; (c) bleaching of a solution of acetone and methylene blue. This bleaching may be repeated as much as 41 times in a day in the Alps, although it may take place only once or twice in a day in England in the winter.

The total ultra-violet radiation from the sky exceeds that which comes directly from the sun. The sun at the zenith gives but 90 per cent of the total sky shine coming from blue sky.

Man's eyes suffer, and his effectiveness in near and far vision work is reduced when artificial light falls too far below the quantity and quality of sunlight. It is to sunlight that our eyes are biologically best adapted.

Studies have been made in an effort to support our physiological evidence of the benefit to health from sunlight, by

proof of correlation between lack of sunlight and higher sickness and death rates. There are so many complicating economic, social, educational, and racial factors involved in comparing neighborhood or district death rates, on a basis of the amount of soot-fall, or on the quantitative presence of ultra-violet rays, that unequivocal evidence as sought has not yet been found, although the opinion is widely held that dark, smoky, foggy local atmospheres actually do cause a rise of local death rates. Certainly in London the presence of serious fog always causes a rise in deaths from respiratory, circulatory, and infectious diseases, and from accidents.

When the air is dirty or smoky, cleanliness and window ventilation are discouraged, light is reduced, plant life is damaged, spirits are depressed, and vitality is lowered.

DEATH RATES PER 100,000 PERSONS OF BOTH SEXES, AGE 10–19, PER ANNUM, FROM ORGANIC HEART DISEASE, 1916–1921, INCLUSIVE

Boston	7.03	Chicago	6.19
New York	5.42	Detroit	4.76
Philadelphia	5.38	Cleveland	4.42
Richmond	2.88	Cincinnati	3.55
Atlanta	1.92	Birmingham	1.67

I am privileged to add here the provisional results of a study of the death rates from organic heart disease (rheumatic carditis) occurring in the age decade 10 to 19 years, in cities in this country, according to latitude and smokiness of atmosphere, from an unpublished report from the Department of Sanitary Science at the College of Physicians and Surgeons of Columbia University.

As one follows the coast cities south from Boston to Atlanta he finds a falling organic heart disease death rate in those 10 to 19 years of age, from 7.03 per 100,000 per annum in Boston, to 1.92 in Atlanta.

Similarly in following soft-coal cities of the country from Chicago south to Birmingham, one finds a fall in the rate from 6.19 in Chicago to 1.67 in Birmingham.

Many factors, and possibly fallacies, need consideration before accepting this as evidence that the changes in these death rates are related to climatic differences in ultra-violet radiations, which may cause differences in the virus of rheumatic fever or variations in the resistance of youth to this infection.

We need studies of this kind. We need animal experimentation to supplement domestic and clinical observations, to supplement and correct our present convictions that sunlight, sunheat, and skylight have indispensable values to health and disease prevention which cannot safely be ignored, and for the preservation of which we are well justified in taking administrative action in the matters of housing and air purity, particularly in our northern cities.

Health Problems Peculiar to the Southern States*

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THE region known as the "southern states," according to the boundaries established by the Southern Medical Association, embraces 16 states and one-third of the population of the United States. In 1930 the residents of this area numbered 40,761,751, of whom 30,513,518 (75.9 per cent) were white; 9,420,880 (23.1 per cent) colored; 702,988 (1.7 per cent) Mexican; 117,369 (0.3 per cent) Indian; and 7,356 (0.02 per cent) Japanese or other orientals. This vast region consisting of 945,028 square miles, or approximately 32 per cent of the total area of the United States, lies mainly in the north temperate zone, but the five gulf coast states lie partly in the subtropical zone. Because of the location and climate of this section and its commerce with tropical countries and air service from them, the inhabitants are more exposed to tropical diseases than are residents in the northern states.

The history of the South, especially in regard to settlement, the Civil War, and the Reconstruction Period, as well as its agriculture and its large negro population, has given rise to the opinion now commonly held that it is a distinct region, having common interests, advantages, and problems. The progress of public health in this region has been influenced by the development of its political, educational, and social institutions, and by economic conditions. Prior to the Civil War, the general standard of living, except among the plantation owners, was low. The four years of Civil War and the subsequent years of misrule during the Reconstruction Period left the South prostrate and poverty stricken. The sickness and death rates were known to be high, but their exact levels were not uniformly recorded. During the last decade of the 19th century the South began to emerge into a new and brighter era. Leaders appeared to give guidance in bettering economic conditions, in improving agricultural methods, in developing the public school system, in building roads, and in furthering other progressive movements. Each of these advancements had a bearing on the public health, but as a distinct movement in itself, public health made very little, if any, progress until the 20th century was under way.

When the Rockefeller Sanitary Commission was organized in 1909 to combat hookworm disease in the South, the states of Maryland, North Carolina, Virginia, and Florida had recently appointed full-time state health officers, and such cities as Baltimore, Richmond, Savannah, and Jacksonville had developed health services creditable for that period. In general, however, the states, cities, and counties of the South, prior to 1910 did not have any real health service, although part-time

* Presented before the Southern Branch American Public Health Association at Birmingham, Ala., November 14, 1932.

physicians may have been employed by state and local governments during epidemic outbreaks. The coöperation of the Rockefeller Sanitary Commission with the states of the South gave impetus to the health movement. The $1,000,000 donation of Mr. Rockefeller to combat hookworm disease was expended in 12 southern states during the years 1910–1915. It made it possible for each state department of health to have from 4 to 6 full-time health officers with laboratory assistants who conducted clinics and educational work throughout the states. The accomplishments against hookworm disease and soil pollution made public health history and incidentally created a popular desire for a creditable and continuous health service. At the same time the state health departments were being organized and strengthened. Their work was placed on a full-time basis in practically all southern states and divisions for diagnostic laboratory service, communicable disease control, vital statistics, and sanitary engineering were created and financed by legislative action.

Beginning with the admission of Maryland into the U. S. Registration Area for deaths in 1906, followed by the admission of Kentucky and Missouri in 1911, and Virginia in 1913, the movement for the improvement of vital statistics records has finally brought into this area all the southern states except Texas. This state will no doubt be admitted in due course. The New England states, Michigan, Indiana, and the District of Columbia, which comprised the original registration area, had been admitted by 1900. Only in the past ten years or less, therefore, has it been possible to compare the general and specific causes of death in the southern states with similar records for other sections of the country.

While the state health organizations were gaining strength, full-time county and city health departments were being developed in the southern states. In 1915, of the 14 full-time county health departments operating in the United States, 11 were located in the South: 1 in Kentucky, 2 in Alabama, 2 in Georgia, and 6 in North Carolina. At the close of 1931, of the 596 full-time county health organizations in 36 states, 451 were located in the 16 southern states, serving more than 17,000,000 inhabitants, or approximately 43 per cent of the total population of this section. The U. S. Public Health Service, the Rockefeller Foundation, and other extra-state health agencies supported this movement. Although in the South the health movement was slower in starting and was confronted with greater difficulties and more serious problems than in other sections of the country, it developed more rapidly there in the past 20 years than elsewhere in the United States.

Public health work, we are confident, has greatly improved the health status of the people of the South, but owing to lack of complete records, except for recent years, we cannot accurately determine the extent of the improvement. Table I compares the average death rates for 1929, the latest published figures, of whites and negroes separately for 34 causes of death in 14 southern states with the rates in 8 northern states. In the columns to the right are shown the comparative averages for 14 states. If the average death rate for the southern white population be regarded as "1" (see column A), then the rates for the southern colored population would be the figures in the second column, B, and those for the northern states the figures shown in the last column, C. A study of the table reveals that in the South the negro rates are markedly higher than the white rates for syphilis, homicide, gonococcal infections, and pellagra, and considerably higher for pulmonary and

TABLE I

GROUP 1. DEATH RATES PER 100,000 POPULATION

Intn'l List No.	CAUSE	So. White		So. Col.		Northern		Comparative Averages		
		Average	Variation	Average	Variation	Average	Variation	"A" So. W.	"B" So. Col.	"C" North
1	Typhoid & paratyphoid	6.71	0.41	15.84	0.32	1.74	0.25	1	2.36	0.26
5	Malaria	9.98	0.90	21.05	0.85	0.19	1.52	1	2.11	0.02
7	Measles	2.06	0.67	1.31	0.70	2.59	0.50	1	0.63	1.30
8	Scarlet fever	2.03	0.43	0.44	1.26	2.21	0.46	1	0.22	1.09
9	Whooping cough	7.36	0.23	13.68	0.34	4.60	0.38	1	1.86	0.63
10	Diphtheria	9.06	0.29	5.65	0.30	6.12	0.46	1	0.62	0.68
11a	Influenza (Pulmonary)	49.12	0.33	60.48	0.55	24.76	0.38	1	1.23	0.50
11b	" (Other)	30.56	0.68	48.30	0.45	12.71	0.41	1	1.58	0.42
16	Dysentery	5.04	0.39	7.09	0.21	0.89	0.41	1	1.41	0.18
21	Erysipelas	2.06	0.22	0.85	0.65	2.74	0.19	1	0.42	1.33
22	Poliomyelitis	0.91	0.46	0.74	0.44	0.65	0.34	1	0.81	0.72
23	Lethargic encephalitis	0.91	0.55	0.43	1.10	1.35	0.31	1	0.48	1.49
24	Cerebrosp. meningitis	2.64	0.76	2.13	0.61	6.01	0.75	1	0.81	2.28
28	Rabies	0.12	0.64	0.05	2.48	0.05	1.00	1	0.45	0.41
29	Tetanus	1.41	0.40	3.42	0.58	0.75	0.33	1	2.42	0.53
31+	Tuberculosis (Pulm.)	52.87	0.31	155.37	0.23	64.62	0.18	1	2.94	1.22
	" (Other)	5.59	0.47	15.52	0.46	9.04	0.13	1	2.76	1.62
38	Syphilis	4.54	0.41	34.54	0.43	7.66	0.28	1	7.60	1.69
40	Gonococcal infection	0.64	0.53	2.79	0.69	0.82	0.31	1	4.35	1.28
54	Pellagra	11.61	0.71	39.47	0.60	0.28	0.79	1	3.40	0.02
60a	Exophthalmic goiter	1.58	0.64	1.38	0.72	4.25	0.46	1	0.87	2.69
66	Alcoholism	2.23	0.48	3.15	0.93	4.55	0.32	1	1.41	2.04
101a	Lobar pneumonia	36.78	0.28	63.09	0.46	49.82	0.20	1	1.72	1.36
165+	Suicide	11.35	0.26	2.93	0.45	16.81	0.24	1	0.26	1.48
197+	Homicide	7.96	0.27	38.54	0.39	6.10	0.36	1	4.84	0.77
175+	Accidents	69.66	0.12	84.87	0.18	85.62	0.11	1	1.22	1.23
	GROUP 2. DEATH RATES PER 10,000 POPULATION AGED 45 AND OVER									
43+	Cancer	32.02	0.20	27.95	0.23	45.74	0.08	1	0.87	1.43
57	Diabetes	5.90	0.22	5.61	0.22	8.91	0.17	1	0.95	1.51
72	Tabes dorsalis	0.44	0.37	0.35	0.62	0.58	0.17	1	0.80	1.30
74a	Cerebral hemorrhage	32.59	0.18	53.87	0.30	35.10	0.17	1	1.65	1.08
129	Chronic nephritis	40.97	0.25	69.35	0.26	34.09	0.22	1	1.69	0.83
	GROUP 3. DEATH RATES PER 1,000 LIVE BIRTHS									
113	Diarrh. and Enteritis under 2 years	10.21	0.23	15.82	0.33	7.38	0.29	1	1.55	0.72
143+	Puerperal causes	7.13	0.15	12.86	0.16	6.35	0.07	1	1.80	0.89
160+	Diseases of early infancy	25.96	0.11	30.54	0.26	26.68	0.08	1	1.18	1.03

Note: 14 Southern States: Ala., Ark., Fla., Ga., Ky., La., Md., Miss., Mo., N. C., Okla., S. C., Tenn., Va.
8 Northern States: Calif., Ill., Mass., Mich., N. Y., Ohio, Pa., Wash.
Averages are the means of individual states' rates.
U. S. Bureau of Census figures for 1929—Table prepared by Hugo Muench. M.D., Statistician and Staff Member of (I. H. D.) Rockefeller Foundation.

other forms of tuberculosis, as well as for tetanus, typhoid and paratyphoid fever, malaria, whooping cough, and puerperal causes. The negro rate is markedly lower than that of the whites of the South for scarlet fever, suicide, erysipelas, rabies, lethargic encephalitis; noticeably lower for measles and diphtheria, and lower to a less degree for tabes dorsalis, poliomyelitis, cerebro-

spinal meningitis, exophthalmic goiter, cancer, and diabetes.

The death rates for southern whites are markedly higher than those for the population of the northern group of states, for malaria, pellagra, dysentery, typhoid and paratyphoid fevers; considerably higher for rabies, influenza, tetanus, whooping cough, and diphtheria; and higher but to a less degree for poliomyelitis, diarrhea and enteritis in children under 2 years of age, homicide, chronic nephritis, and puerperal causes. The rates for the general population of the northern group of states are appreciably higher than those for the southern whites for exophthalmic goiter, cerebrospinal meningitis, and alcoholism; and higher but to a less degree for syphilis, tuberculosis, diabetes, lethargic encephalitis, suicide, cancer, lobar pneumonia, erysipelas, measles, tabes dorsalis, gonococcal infections, accident, scarlet fever, cerebral hemorrhage, and diseases of early infancy.

Although the North has its excessive death rate from exophthalmic goiter and cerebrospinal meningitis, the South has its excessive rates among whites from malaria, pellagra, and typhoid. In general, however, the death rates among the southern whites compare favorably with the rates in other parts of the country. The negro death rates are generally exceptionally high and as a result have raised the average rates for many causes of death for the South.

The rate of growth in public health expenditures has been more rapid in the South than elsewhere in the United States during the past 20 years. This is all the more striking when it is realized that the average per capita wealth in the southern states * ranges from $1,284 to $3,196, and the average per capita income † from $248 to $653, as compared with 8 northern states (see Table I, footnote) for which the per capita wealth * ranges from $2,880 to $3,725, and the per capita income † from $661 to $1,158.

The growth in public health expenditures can be illustrated by the fact that the health appropriations in the 11 southern states originally aided by the Rockefeller Sanitary Commission had increased from $225,395 in 1910 to $3,845,580 in 1930, or 1,600 per cent. The legislatures of Alabama and Virginia each appropriated in 1930 more than twice as much money for public health work as did the 11 southern states combined in 1910.

The question naturally arises as to whether or not there has been a larger reduction of the death rates for controllable diseases in the South than in the North. If the answer should be based upon the percentage of reduction, the showing for the South in general would not be as favorable as for the North. The objection to a percentage basis is that it gives no idea as to the number of lives saved. For example, if a state has 3,000 deaths from a certain disease, it must reduce the number by 1,500 in order to have a 50 per cent reduction, whereas another state having only 4 deaths from the disease could, by a reduction of 2 deaths, show a 50 per cent reduction. A comparison based upon the change in the mortality rates indicates more accurately, we believe, the relative progress, because it reflects the number of lives saved. Table II compares the average mortality per 100,000 population for a 9-year period, 1921–1929, in 10 southern states, with the average change for the same period for either the original registration area, or the U. S. Registration Area. It will be noted that, with very few exceptions, the reductions in death rates in the 10 southern states exceed those in the

* Figures are from *The National Market*, Crowell Publishing Co., 1926.

† Figures are for the year 1928 as published in the *World Almanac* (1931).

control areas for typhoid fever, malaria, and tuberculosis.

Aside from the influence of the negro on health problems in the South, there are, of course, certain important diseases that are peculiar to this region. One of these is hookworm disease. Through the intensive measures directed against this infection during the period 1910–1915, its prevalence and severity have diminished. The subsequent continuation of treatment and the intensive work in rural sanitation have further limited the disease, but there are still sections in the South where little has been done and where the clinical disease is still found. Formerly it was customary to make the diagnosis of hookworm disease when persons were found to harbor hookworms, regardless of whether or not clinical symptoms were manifested. Furthermore, the assumption was that in the absence of adequate sanitary facilities, any person who deposited hookworm ova on the soil was a menace. In more recent years the students of this disease have made a distinction between infestations causing illness and those resulting in a carrier state only. Certain soils have been found to be unsuited to the development or survival of hookworm larvae. These developments have led to some misunderstanding as to the character and importance of the present residue of the disease in the South. As the disease is seldom given as the cause of death, it

TABLE II

ANNUAL CHANGE IN MORTALITY PER 100,000 POPULATION, 1921–1929

State	Typhoid and Paratyph.	Malaria	Diphtheria	Tuberculosis (all forms)	Diarrhea and Enteritis under 2 yrs.*	Puerperal*	Infant Deaths*
Fla.	−1.32	+0.16	−0.39	−3.38	−2.69		
Ky.	−1.08	−0.14	−1.74	−4.05	−0.44	−0.03	+0.45
La.	−0.80	−1.48	+0.05	−4.63	−2.54		
Md.	−0.50	−0.02	−0.88	−4.19	−5.12	−0.07	−2.08
Miss.	−0.77	−2.55	−1.01	−2.18	−0.15	−0.02	+0.52
Mo.	−0.71	−0.15	−1.88	−2.36	−1.45		
N. C.	−0.76	−0.74	−0.75	−2.90	−3.44	+0.04	+0.50
S. C.	−0.68	−0.80	−0.22	−4.00	−1.81		
Tenn.	−1.23	−0.78	−0.71	−2.66	−0.61		
Va.	−1.07	−0.17	−1.40	−4.38	−2.88	+0.01	−0.25
O. R. S.	−0.41	−0.12	−1.27	−2.83			
U. S. R. A.					−2.56	+0.02	−1.25

* Rate based on 1,000 live births.

Notes: This represents the average annual change in actual deaths per population, as obtained by fitting a trend line to the years in question.

O. R. S.—Original registration states, all in the North.

U. S. R. A.—Entire registration area, including southern states.

Table prepared by Hugo Muench, M.D., Statistician and Staff Member of (I. H. D.) Rockefeller Foundation.

is not possible to ascertain its exact status in any community, except by surveys involving the examination of samples of the population. Fortunately quite a number of such surveys have been made from time to time in typical counties, and as a rule they show that hookworm disease is gradually diminishing in prevalence and in severity. A number of surveys of Mississippi counties are being made this year.

Malaria in the past has been widespread in the United States, occurring in such states as New York, Ohio, Michigan, and Iowa; but with the clearing and cultivation of the land, and improved drainage, this disease has gradually receded southward, so that its prevalence now is limited essentially to the southern states. In towns and cities of this section it is, as a rule, under control, but in certain rural areas it is still a real health problem. Its prevalence varies from year to year with the amount and character of precipitation in the spring and summer months. The *Anopheles quadrimaculatus* is the only vector of malaria of importance in the South. The habits of this mosquito are better understood than formerly, likewise knowledge as to practical control measures is more definite than in the past, so that we are better prepared than formerly to combat the disease.

Pellagra, it will be noted from Table I, is practically absent from the northern group of states, but in the South the death rate for this disease among the whites is 11.61 per 100,000 population, and among the negroes, 39.47. Its occurrence generally seems to be associated with low standards of living, including a lack of certain essential foods. Through the researches of Goldberger of the U. S. Public Health Service and others, practical methods for combating the disease are now known, and in varying degrees are being applied. In 1929, there were 6,621 deaths from pellagra in the registration area; 70 per cent of them occurred in 6 states—North Carolina, South Carolina, Georgia, Mississippi, Alabama, and Arkansas (Table III).

Typhoid fever is not peculiar to the South. Epidemics have occurred in recent years in northern states and in Canada, but from the standpoint of prevalence and death rate, the disease is far more a problem in the South than in the North. By reference to Table I, it will be noted that the typhoid death rate for the southern states among the whites is nearly 4 times that for the northern group of states, and among the colored population more than 9 times as great. Surveys made in recent years have shown that the greatest prevalence of typhoid in the South is in small towns which are not adequately sewered or otherwise sanitated. Typhoid surveys in the South were begun by the U. S. Public Health Service about 1911, while the hookworm campaign was under way. The forces engaged in activities against both diseases found common ground in the improvement of rural sanitation and in the establishment of full-time county health organizations. The building of sanitary toilets was the initial activity of many of the full-time county health departments that have been established in the South. It is interesting to note from Table II that the average reduction in typhoid for the past 9 years in each of the 10 states listed is somewhat greater than in the northern states composing the original registration area. The fact remains, however, as indicated by the rates for 1929 shown in Table I, that the disease is still a serious health problem in the South, demanding better methods for disposal of excreta, further improvement in water and milk supplies, and further protection against human carriers and flies and other insects which may carry the disease.

Tuberculosis presents a problem of great magnitude among the negroes in the southern states. As shown in Table I, the average death rate for pulmonary tuberculosis in 1929 among the colored population of the South was 155.37 per 100,000. In comparison with this, the average rate for all races

TABLE III

NUMBER OF DEATHS FROM PELLAGRA

States	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
Ala.	–	–	–	–	–	–	–	–	–	–	413	502	557	600	666
Ariz.	–	–	–	–	–	–	–	–	–	–	–	9	7	13	8
Ark.	–	–	–	–	–	–	–	–	–	–	–	–	655	633	515
Calif.	28	25	24	22	23	12	15	13	33	28	48	45	40	54	42
Col.	2	3	4	2	3	1	5	4	4	0	4	1	2	3	4
Conn.	1	1	5	4	5	1	1	0	2	2	2	1	1	2	4
Del.	–	–	–	–	0	0	0	0	0	0	0	0	0	1	0
Fla.	–	–	–	–	125	114	131	110	101	102	126	131	222	291	315
Ga.	–	–	–	–	–	–	–	498	437	334	–	–	–	859	878
Ida.	–	–	–	–	–	–	–	–	–	0	1	–	–	–	–
Ill.	–	–	–	26	17	11	9	8	5	7	10	19	31	40	16
Ind.	9	4	6	12	5	3	6	1	1	1	1	5	4	8	2
Ia.	–	–	–	–	–	–	–	–	3	0	2	5	2	1	2
Kan.	28	10	28	22	19	8	6	9	4	10	12	13	8	11	9
Ky.	149	124	197	147	111	65	65	73	68	58	88	144	160	178	133
La.	–	–	–	263	227	203	181	134	152	186	352	268	342	330	285
Me.	10	15	19	16	5	4	8	7	5	2	1	9	6	6	3
Md.	16	3	16	18	9	8	6	4	6	3	7	5	18	8	10
Mass.	25	40	19	21	14	11	13	9	11	12	10	11	10	11	11
Mich.	12	5	6	9	4	5	2	2	6	5	4	7	4	6	8
Minn.	1	2	0	4	2	1	0	2	3	1	2	2	3	2	5
Miss.	–	–	–	–	495	558	683	450	409	434	570	563	706	755	754
Mo.	34	41	59	56	25	25	20	14	12	16	21	29	29	36	27
Mont.	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1
Neb.	–	–	–	–	–	1	1	1	2	0	2	1	0	3	3
Nev.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
N. H.	5	11	5	2	2	1	0	3	2	2	0	1	1	2	1
N. J.	5	4	2	2	4	1	2	4	2	3	5	2	5	5	2
N. M.	–	–	–	–	–	–	–	–	–	–	–	–	–	–	31
N. Y.	12	28	29	21	21	12	19	8	14	17	14	28	18	11	23
N. C.	347	485	620	696	400	318	338	330	239	381	382	455	671	851	950
Ohio	5	5	3	7	8	3	3	5	1	7	11	9	16	21	21
Okla.	–	–	–	–	–	–	–	–	–	–	–	–	–	238	279
Ore.	–	–	–	2	0	0	0	2	1	2	2	2	0	2	3
Pa.	6	4	5	7	6	4	6	5	8	9	19	7	24	14	15
R. I.	9	8	6	7	4	3	4	2	1	1	6	1	2	1	2
S. C.	–	729	714	741	401	306	367	427	332	336	435	563	772	999	943
Tenn.	–	–	750	676	435	302	329	273	298	263	384	530	604	521	412
Utah	0	0	0	0	1	0	0	1	0	0	2	0	1	1	0
Vt.	3	2	5	5	7	1	2	0	1	1	2	3	1	2	1
Va.	332	248	302	327	177	134	119	108	78	75	97	116	156	193	228
Wash.	2	0	2	0	1	0	1	2	0	1	2	0	1	1	0
W. Va.	–	–	–	–	–	–	–	–	–	–	7	7	5	6	5
Wis.	1	1	3	2	2	1	1	3	4	1	1	0	3	2	2
Wyo.	–	–	–	–	–	–	–	–	–	1	1	2	0	–	–

in 8 northern states was 64.62, and for the white race in the southern states 52.87. The status of the southern whites with regard to pulmonary tuberculosis would appear, therefore, to be more satisfactory than that of the general population in the North. The picture is markedly different for the negroes in the South, and this is true for all other forms of tuberculosis as well. That progress is being made in the suppression of tuberculosis is indicated in Table II. During the period between 1921 and 1929 the average annual change in mortality due to all forms of the disease has shown improvement, and this change has been more marked for a number of the southern states than for the states composing the original registration area. It is obvious, however, that much remains to be accomplished in the suppression of this disease among the negroes of the South and that the solution of the problem should continue to receive the most careful consideration of the public health workers of this region.

Dengue (Table IV), like hookworm disease, does not stand out in the mortality tables, but from time to time it becomes epidemic in the southern states, as in 1922 when it caused 548 deaths in nine southern states. The number of deaths does not reflect the widespread sickness and disability, the serious impairment of the physical efficiency of thousands, and the crippling of agriculture, industry, and commerce, that result from a dengue epidemic. As yellow fever is spread by the mosquito *Aedes aegypti,* which is also the vector of dengue, and as almost the entire population of the United States is non-immune to yellow fever, the introduction of the disease from South America into the southern states must be considered as a possibility. The last epidemic of yellow fever in this country occurred in 1905. It was almost completely confined to New Orleans, in which city there were 434 deaths in that year.

Endemic typhus is also to be reckoned with in the southern states, where the disease is apparently on the

TABLE IV

NUMBER OF DEATHS FROM DENGUE

States	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
Ala.	–	–	–	–	–	–	–	16	2	–	1	0	–	3	1
Calif.	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–
Fla.	4	–	–	1	2	–	8	125	19	10	11	8	3	4	0
Ga.	–	1	–	–	–	3	–	128	17	2	2	0	–	6	0
Ky.	–	–	–	–	–	–	–	–	1	–	1	0	–	–	0
La.	–	–	–	1	–	–	–	143	52	–	1	1	–	2	1
Mich.	–	–	–	–	–	–	–	–	–	–	0	0	1	–	0
Miss.	–	–	–	–	–	–	–	16	5	–	1	1	–	3	0
Mo.	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–
N. Y.	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–
Pa.	–	–	–	–	–	–	–	–	–	–	0	0	1	–	0
S. C.	–	–	–	–	–	–	–	40	2	–	–	–	–	1	–
Tenn.	–	–	–	–	1	–	1	–	–	–	–	–	–	–	–
Tex.	–	13	2	4	–	–	–	78	11	1	1	0	–	1	1
Utah	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Vt.	–	–	–	–	–	–	–	–	–	–	0	0	1	–	0
Va.	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–
Wis.	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–

increase. In 1929 it caused 11 deaths in Alabama and during the first 6 months of 1932, 200 cases were reported to the U. S. Public Health Service from Alabama and Georgia; 125 of these cases occurred in Alabama, where there were 5 deaths. It has been found by officers of the U. S. Public Health Service that the important vector of the disease in the southern states is the rat flea. The situation is sufficiently important to call for prompt attention.

SUMMARY

The South has made rapid progress in the field of public health. The negro is responsible for death rates in the South that are considerably higher than the death rates in other sections of the country. Any program for the improvement of health and the lowering of death rates in the South must afford the negro health protection. For the whole population in general, and the negro in particular, intensive public health measures should be carried on to combat such diseases as syphilis, pellagra, malaria, typhoid, tetanus, whooping cough, diarrhea and enteritis in children under 2 years of age, and other diseases which still cause high death rates. That progress has been made in the control of certain diseases in the South is reflected by the figures in Table II.

In the solution of health problems peculiar to the southern states, it is fortunate that those interested in and engaged in public health service in this section of the country can meet together and exchange ideas and experiences and plan for more effective and more concerted action against the common enemy, disease.

Undulant Fever

A STUDY [1] recently carried out in Ontario is not only interesting in itself, but almost more so in the implications involved.

In a hospital for epileptics where the patients were supplied with milk from a herd belonging to the hospital and known to be infected with contagious abortion, 100 patients were tested by the agglutination test, as well as the skin reaction. Under the first test, 63 showed a positive agglutination reaction, in 23 of whom the dilution was 1 to 80 or greater. The intradermal skin reaction was positive in 45, in 7 of whom it was weak, in 19 moderate, and in 19 strong. Clinically, 26 had fever, usually of the undulant type, the average peak being about 100° F. Sixteen were definitely underweight, running from 20 to 30 lb., while 3 showed enlargement of the spleen, and 2 tenderness in the splenic area.

The authors concluded that 22 per cent gave evidence of active infection, 38 per cent of past infection, and 40 per cent no evidence of infection. While the authors content themselves with commenting upon the value of laboratory tests in general, and the intradermal skin test in particular, some commentators hold that the results indicate that the *Br. abortus* may not only cause the typical fever associated with it, but also may give rise to latent and subclinical infections not usually recognized as types of undulant fever.

REFERENCE

1. *Canad. M. J.*, Nov. 1932, p. 490.

Industry in Medicine*

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THE problems with which this section of our Association deals are, for the most part, properly comprised under the title of "Medicine in Industry." If we use the term "medicine" in a broad sense to include the allied sciences of hygiene and sanitation, we are here chiefly concerned with the direct applications of medicine to the safeguarding of industrial tasks and the promotion of industrial efficiency. In the pursuance of such purely industrial aims, however, the scope of services rendered has broadened to an astonishing degree. In many instances the development has gone so far as to transcend the primary concept of a service rendered by medicine to industry. In such cases it would be more accurate to say that industry is serving the broad cause of medicine as a whole since it is providing medical care of unusual quality and under peculiarly favorable conditions not only to industrial employees but to their families as well and sometimes to the entire populations of the communities concerned. It is with such extensions of industrial health services that I propose to deal briefly; and I have chosen the title "Industry in Medicine" to indicate the change of emphasis with which I am concerned.

In general, it may fairly be said that the major stimulus for the development of industrial medical services in the United States has come from the Workmen's Compensation Acts. The physician was first brought into the factory to care for industrial injuries and thus to minimize compensation costs. Once in the employ of industry, however, he found many other things to do. The care of compensable injuries led on to the care of ambulant cases of non-compensable illness, to periodic health examinations, to sanitary control of industrial processes, and to hygienic supervision of the life of employees. The National Industrial Conference Board in its last report[1] lists the objectives and activities of the medical department in the following inclusive terms:

> The following points have been indicated as the foremost objectives of industrial medicine:
>
> 1. To place individuals in the work for which they are best fitted
> 2. To procure and maintain fitness for work
> 3. To educate the worker in personal hygiene and the prevention of accidents
> 4. To reduce loss of time, absenteeism, and short work spans
>
> In attaining these objectives medical departments in industry are found to be engaged in the following activities:
>
> 1. Physical examinations of:
> a. Applicants for positions
> b. Those who have been absent because of illness, upon their return to work
> c. Employees who are being transferred from one department to another
> d. Employees to be promoted to more important positions
> e. Those engaged in occupations hazardous to their health or the safety of others
> f. Those who have defects that should be followed up

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

g. Older workers
h. All workers in a general program of health promotion

2. Diagnosis and treatment of injuries resulting from accidents that occur during working hours

3. Diagnosis and occasionally treatment of surgical conditions not resultant from working conditions.

4. Diagnosis and treatment of minor illnesses. These are treated usually only so long as the employee is able to come to the plant dispensary or hospital.

5. Assistance, chiefly through advice, in obtaining proper care outside the plant for cases of a more serious nature, or those for which there are no facilities in the medical department. This entails coöperation with the family physicians of employees and with local health organizations, clinics, and specialists. Medical supervision can act as a general clearing house for all matters in reference to medical care of employees.

6. Education of the worker in safety practices, personal hygiene, and health habits.

7. Supervision of sanitation, illumination, ventilation, and all other working conditions that affect health, with special attention to occupational disease hazards.

8. Research.

9. Occasionally, insurance and compensation adjustment.

It is important, I think, in dealing with activities which are expanding so greatly, to consider with some care the underlying principles which justify their existence and which should govern their development. I take it that there are essentially two such principles.

First, the employer has a moral (and often a legal) responsibility to protect his employees against any special hazards to health which are inherent in a particular industry. Measures of this type are not matters of choice, but essential and inalienable duties. Under this heading come such services as the following: safety engineering such as will offer reasonable protection against accident hazards, poisons and dusts; adequate lighting, ventilation and sanitary facilities; care of industrial injuries; and routine medical examination of workers exposed to harmful dusts and to poisonous substances. These are matters of common justice, as between man and man.

Second, the employer has a clear right (though not a moral responsibility) to provide any further health services which will promote efficiency in industrial production. Under this heading come such items as: physical examination of employees not exposed to special industrial hazards; diagnosis and treatment of non-industrial accidents and illnesses; special physiological and psychological services for the adjustment of the worker to his task; health education and advice as to health habits; provision of luncheon facilities and of opportunities for physical exercise and recreation. The National Industrial Conference Board, in the report cited above, states the argument for medical service from this standpoint of efficiency as follows:

> There are two vital, coöperating factors in modern industry, the machine and the man who tends it. If ill health of the worker, causing labor turnover or absenteeism, stops the machine, there is a loss in output. In like manner, if the machine fails to run to its full capacity during working hours because the worker is listless or inattentive, there is loss in productive efficiency. One of the principal reasons for failure of the worker to do what he is capable of doing is an impaired physical condition. He may have a cold or other minor ailment, perhaps the beginning of a more serious illness, or he may have returned to work after an illness before he had gained his full strength. For one cause or another he has an impaired vitality which lowers his efficiency. When the services of a medical department are freely sought and freely given there is a continuous conservation of the health of the employees which keeps their efficiency at normal levels and enhances the value of their services to their employers.

The same report cites a particular instance in which absenteeism due to illness and accidents was reduced from 4 per cent of all working time to 1.3 per cent by health supervision. The cost of the medical service provided was $6,398. The saving involved in workmen's compensation and group life

insurance premiums was estimated at $2,848 and the saving to the company by reduced absenteeism at $5,370—a total of $8,218.

These two motives, then—justice and efficiency—are the sound bases of industrial health and welfare work. Anything which can be justified on either of these grounds is wise and reasonable. Anything which cannot be shown to contribute to one or the other of these ends is of doubtful value as an industrial activity. For industry which embarks on philanthropy (except in times of temporary and peculiar economic stress like the present one) lays itself open to the obvious criticism that if there are available such large profits as to justify philanthropy it would be sounder to turn such profits into increased wages or lowered costs and permit the employee or the purchaser to benefit himself in his own way.

In the present discussion we are concerned chiefly with those measures which extend beyond obvious moral obligation; and the first of these is the provision of health examinations for the general working staff. This practice has grown rapidly in recent years. The National Industrial Conference Board report states that of 1,818 companies covered in its 1930 survey, 53 per cent were making initial physical examinations of employees and 20 per cent subsequent periodic examinations. Miss Elizabeth Dublin in a more recent study made for the National Tuberculosis Association (courteously communicated to the writer in manuscript) has covered 6,012 plants employing 4,402,280 persons and reports that 5,542 of these plants with 4,105,171 employees had examinations before employment while 3,254 plants with 3,134,740 employees had subsequent periodic examinations for at least some of their employees. These figures are most surprising and encouraging.

The advantage of the physical examination, both to the employer and the employee, is very great. Its primary objective—even in the examination before employment—should not be rejection of the subnormal worker. The Conference Board of Physicians in Industry has laid down the principle that the applicant should be rejected only if his disability is such as to make his employment a menace to himself, to fellow employees or others, or to property. Of 221 plants reporting to the N.I.C.B. in 1930, 38 rejected more than 10 per cent of applicants as a result of the health examination, which indicates the application of an unduly severe standard. In general, nevertheless, it appears wholly reasonable that a company which may be called on to pay compensation should have a record of the physical condition of its workers prior to employment, and the benefit to the employee himself in the detection of correctible defects and in selection of a safe line of employment is inestimable.

The second field in which medical service in industry has broadened out has been in the diagnosis and treatment of non-compensable injuries and illnesses. Here, as in the case of the physical examination of workers engaged on tasks free from specific industrial hazards, there is no moral obligation involved. The reason for such developments is that minor illnesses form the major cause of industrial absenteeism. Experience has shown that prompt and competent medical care will materially reduce such temporary disability; and also that prompt and competent medical care is not generally available for the factory worker on terms and under conditions which actually lead to its utilization. Hence, many industries provide general diagnostic service for their employees, render first aid treatment in emergencies, and give assistance and counsel to the worker who requires more prolonged care.

These two types of activity, the health examination and the diagnosis and emergency treatment of illnesses of a non-industrial nature, represent fairly common extensions of industrial health service into the domain of general medicine. In certain instances, the process has gone much further; and it is these more extensive developments which I have indicated by the title "Industry in Medicine" and which I propose briefly to review.

If it be granted that maximum efficiency in industry depends on a working force which enjoys a maximum degree of physical and mental health, it is clear that the employer is vitally concerned with the general medical care available for his employees. If diagnostic service and first aid provided by the plant and other medical service provided by existing facilities of private medical practice and public clinic service are adequate, well and good. If such facilities are not meeting the situation, however, the employer may very properly consider whether a further extension of industrial health service will not bring returns commensurate with the cost involved.

According to Pierce Williams,[2] about 540,000 gainfully employed persons in mining and lumbering companies in 21 states were eligible in 1930 for medical care on such an organized basis. In consideration of a fixed periodic deduction from wages these employees are entitled to medical treatment for conditions not covered by workmen's compensation, the payment being sometimes voluntary and sometimes a condition of employment. These industries, it is obvious, are usually carried on in isolated regions where medical care could not be obtained unless it were furnished by the industry itself. Similar services are provided for about one-third of all the Class I railroads of the United States by memberships in employee hospital associations.

Finally, we must recognize that the industrial employee is generally not an isolated unit but a member of a family. If there is uncared for illness at home his worry and distress may gravely impair his efficiency. Where the local medical facilities are inadequate, may it not, therefore, be justifiable for industry to provide medical care for the family as well as for the worker himself? In a surprisingly large number of instances, this question too has been answered in the affirmative.

The Committee on the Costs of Medical Care has made several illuminating studies of enterprises of this kind. The Endicott-Johnson Company of Binghamton, N. Y., for example, provides very complete medical care for all its employees and their families.[3] The service covers all ordinary types of medical care for ambulant and bed cases, including physical therapy, X-ray therapy, heliotherapy, and the services of a psychologist for patients not overtly psychotic. It covers dentistry so far as simple repair, extractions, and hygiene are concerned. It covers nursing in home as well as in hospital. It provides drugs and medicines free; but not orthopedic supplies and eyeglasses except to those reported as unable to pay for them.

The organization maintains three medical centers each including hospital service, a first aid station and clinic, and several travelling clinics. The staff in 1928 included 28 physicians, 4 dentists, 5 dental hygienists, 2 physical therapists, 67 trained nurses, 4 bacteriologists, 4 pharmacists, 17 technicians, and 16 clerks and office assistants. The organization in addition calls extensively on outside facilities, having spent $250,000 in 1928 for care of patients in community hospitals and $40,000 for outside specialist and consultant service.

There were 15,230 workers employed by this company during the year 1928

with 25,891 dependents (according to Carpenter's estimate), a total of 41,121 persons eligible for service. Carpenter concluded from a special sampling study that 77 per cent of these persons used the company service only, and an additional 17 per cent used it in part. The total cost of the medical organization was $898,874 or $25.49 per year per individual in those families which actually used the service.

The quality of the medical service rendered (as reported upon by highly qualified experts in medicine and surgery) was equal to or better than that provided in similar areas by private physicians; and free choice of physician within the staff and the general flexibility of the system secured a high degree of sound personal relationship between physician and patient.

As pointed out, industrial medical services of this type have most often been provided in remote areas where no private practitioners were available. Even in more urban communities, however, there are distinct advantages in such a program. The first and foremost of these advantages is that under such an organized program medical advice will be far more generally utilized for health examinations and for the early treatment of incipient disease than would be the case if the individual were left to seek and to pay for medical services on his own initiative. Since prevention and early recognition of incipient disorders form the keystones of modern medicine it is difficult to exaggerate the importance of this factor. The second major argument for an organized medical program serving a group of industrial employees is of course the economy of overhead charges and of the time of professional personnel which is involved.

These values of an industrial medical service are excellently illustrated by another of the studies of the Committee on the Costs of Medical Care dealing with the Homestake Mining Company.[4] This is a corporation mining gold in the Black Hills of South Dakota with headquarters in the town of Lead. It employed in 1930 an average of 1,855 persons and provided medical care without charge for all these employees and their dependents—a total of 5,332 persons. The service included all forms of medical and hospital care but not dental care and not home nursing. Medicines were provided free but eyeglasses only at cost. The company maintained a 26-bed hospital with a well equipped dispensary including laboratories, X-ray and physiotherapy rooms. The staff consisted of 5 full-time physicians, 6 registered nurses, and a dispensary nurse. Employees had free choice among the 5 physicians and relationship with patients was close and intimate. The total cost of the medical department in 1930 was $79,326, or $14.88 per person served.

From the standpoint of completeness, Reed compares the volume of service rendered with that actually received by groups of the general population of the United States at comparable economic levels (as revealed by other studies of the Committee on the Costs of Medical Care). He finds that the amount of hospital care for the Homestake group (excluding industrial accidents) is almost exactly the same as that for the general population (0.6 day per person per year); while the number of medical home calls (2.1 per person per year) is about twice that for the general population, and the number of office and clinic calls (8.7 per person per year) is more than 6 times that for the general population.

The values from the standpoint of economy are equally clear. Reed analyzed the Homestake records with great care as to the exact number of services of each kind which were rendered and estimated the cost of such services at the prevailing rates in force

in districts adjacent to Lead. He found that the services which actually cost $79,326 would have cost $175,378 if obtained under ordinary conditions. Yet the medical staff of the company receive salaries well above the average for similar areas.

There are obviously certain dangers which inhere in any such program which involves the conduct of medical practice under lay control. These dangers fully justify the opposition of the American Medical Association to any form of contract practice which involves unfair competition. It seems clear, however, that "unfair competition" cannot be held to result from superior efficiency and economy of organization since the basis of medical ethics is ultimately the welfare of the patient. "Unfair competition" exists when either (a) the service rendered to the patients is below standard, or (b) when the physicians employed are exploited by under-pay or overwork (which in the long run must of course operate to the detriment of the patients themselves). These dangers must be constantly guarded against in industrial medical services. They do not appear to be manifest in either the Endicott-Johnson or the Homestake program.

In both the instances cited, the entire cost of the medical service was borne by the industry concerned. In other instances organized medical programs have been developed under the auspices of employee groups. Examples of this type are to be found in the operation of a hospital with a salaried medical staff by a branch of the United Mine Workers of America at West Frankfort, Ill., and in the provision of medical care through part-time salaried physicians by the New York Letter Carriers' Association. According to Pierce Williams in the report cited:

> In by far the greater number of industrial medical services, the provision of care is financed jointly by the company management and by the employees. Such arrangements usually develop from contracts which the companies draw up with local medical practitioners and hospitals, or from the organization of a medical department under the company's direction. The employees contribute through payroll deductions.

Williams cites the services in the mining and lumbering industries and in railroading as examples of this type of organization. which seems a highly promising one. The psychological relationship between physician and patient and the attitude of the employee toward the service as a whole are likely to be sounder and more fruitful if the employee realizes that he is contributing toward the support of the program.

As illustrating how a medical organization may be developed through a group of small industries acting jointly for the service not only of their own employees but of other members of the community, we may consider one final example—that of Roanoke Rapids, N. C. This is the third of the special industrial studies of the Committee on the Costs of Medical Care.[5]

The program at Roanoke Rapids began with the employment of physicians by the local cotton mills. To meet obvious local needs these physicians on their own initiative established a hospital which was later purchased and enlarged by the mill corporations. At this time (in 1924) the employees of the mills, with only 4 negative votes among 2,500 employees, approved a payroll deduction of $.25 a week to pay for hospital care. The program therefore represents a rather unusual coöperation between employers, employees, and medical staff in which all three have played an active part.

The organization in 1930 was as follows—5 physicians and 3 visiting nurses were employed by 4 industrial establishments to care for their employees, and the employees of these 4 companies and of a fifth company contributed $.25 a week for hospital costs. Al-

though the physicians and nurses were separately and independently employed by the various firms, they operated as a group, with free choice for the entire population served and with some degree of specialization in surgery, pediatrics, and internal medicine. Home, dispensary and hospital care and home and hospital nursing are all provided to the group of mill employees and their dependents and to local groups of teachers and nurses, a total of 4,919 persons. Dentistry and drugs are not provided.

The rest of the population (5,693 persons) is cared for by the same medical staff (and by the one additional physician in the community, a specialist in eye, ear, nose and throat work) on a fee basis since the salaried physicians are permitted to do outside practice in their spare time.

This arrangement made it possible to compare services and costs for two approximately equal population groups in the same community, one served on an organized and the other on an unorganized basis. The economic status of the two groups was approximately equal ($24.50 per week income per family for the mill group as compared with $27.16 for the non-mill group).

The mill group paid $17.44 per capita during the year for medical services, the non-mill group, $10.34. About one-third of the $17.44 came from the employees directly in monthly check-off plus additional costs paid individually, the other two-thirds from the companies. This, of course, illustrates the fact that an organized contributory program, plus a subsidy from the employer, increases the total amount of money available for the costs of medical care. For this additional 70 per cent of expenditure, moreover, the mill group actually received over 500 per cent more days of hospital care, 350 per cent more clinic visits and 240 per cent more home calls. The actual figures (for a typical group intensively studied): 3.2 patient days a year for hospital care in the mill group as against 0.5 day for the non-mill group; 1.8 dispensary visits per year for the mill group as against 0.4 for the non-mill group; 2.4 home calls a year for the mill group as against 0.7 for the non-mill group.

It seems clear to the writer that two basic principles must govern the development of medical service in the United States if the potential resources of modern medicine are to be made really available for all the people under conditions of maximum effectiveness.

In the first place the studies of the Committee on the Costs of Medical Care have demonstrated the great advantages of organization of the professional personnel and equipment which renders the medical service. Such organization may be effected by the profession itself, by an industry or some other agency representing the patient, or by the coöperation of both; but, if soundly and wisely planned it benefits both profession and patient. The patient receives better service from an organized than an unorganized service, for a given individual physician will be both psychologically stimulated and materially assisted by working in intimate relationship with a group of his peers, and the patient receives a given service at substantially lower cost on account of the saving of overhead and of professional time inherent in organization. Similarly, the physician gains from group practice better conditions for work and larger and more assured income.

In the second place, it is equally clear that the consumers of medical service should be organized so as to facilitate the payment for such service. The average costs of medical care are too low rather than too high. What causes our difficulties is the fact that illness is an emergency. While many families in a given year pay little or

nothing, one family out of a hundred will be crippled by costs equivalent to a quarter or a half of its annual income. It is quite obvious that here, as with other emergencies of life, the rational answer is to apply the principle of insurance. Whether the funds come from a group of individual families, from their employers, from the state, or from two or all of these three sources, the payment into a common fund of a certain sum for each family each year is the essential element in the scheme. Such an arrangement wipes out the burdens of the care of emergency illness by spreading them over a group of families and a period of time. It makes easily available considerably larger total sums for medical care than could otherwise be secured. Finally, and perhaps most important of all, it makes possible a true preventive medicine, based on the health examination and the prompt treatment of incipient disease, such as can never be attained when the consultation of a physician calls for an immediate corresponding financial obligation.

There are many and various ways in which such organization for the delivery of medical service and such organization for the payment for medical service can be attained. On the professional side, it would seem ideally desirable that the organization should take place under professional auspices, with such safeguards for the public interests as are furnished for example by the Board of Trustees of a voluntary public hospital. I can visualize a time when such hospitals will attach to themselves the great majority of physicians in their respective areas and will provide complete hospital, dispensary and domiciliary care on a fixed annual fee basis. If medical agencies fail to take the initiative, however, lay agencies must do so; and industry will, in many communities, be in position to do what has been done at Binghamton, Lead, and Roanoke Rapids.

On the payment side, the one logically complete answer to the problem is that given by compulsory state sickness insurance. This is the answer which has been given in practically all European countries; and it may prove to be the ultimate solution in the United States. The program has, however, shown serious defects even in Europe and these defects might perhaps be exaggerated in the political atmosphere which prevails on this side of the Atlantic. Here, as in many other fields of social endeavor, there is at least a possibility that industry—actuated by a new sense of social responsibility—can attain some of the ends sought by state action in Europe with results more in keeping with our national psychology. The extent to which American industry can evolve such a sense of social responsibility during the next 20 years will determine the issue.

"Medicine in Industry" has come to stay. It will always be essential that the employer should safeguard his workers against the specific hazards inherent in their employment. How far "Industry in Medicine" may develop, only time will show. It will, I think, come to be recognized that an organized program of medical services paid for on a periodic contributory basis is an essential of sound community life and therefore of industrial life which forms the basis of community life. Such a program will ultimately be carried out on a basis of state action if the need is not first met in some other way. I can see no other way for industrial communities than the organization of the payment side of the problem by the industries themselves—either contracting for organized medical service with hospitals, group clinics or other professional agencies or providing through industrial initiative the service as well as the system of payment. It will be well for the far-sighted industrialist to study

this problem with care, particularly if he is not anxious for the extension of governmental agencies into new fields of activity.

REFERENCES

1. *Medical Supervision and Service in Industry*, National Industrial Conference Board, Inc., 247 Park Ave., New York, 1931.
2. Pierce Williams. *The Purchase of Medical Care through Fixed, Periodic Payments.* National Bureau of Economic Research, 51 Madison Ave., New York, 1932.
3. Niles Carpenter. *Medical Care for 15,000 Workers and their Families; a Survey of the Endicott Johnson Workers Medical Service; 1928. Publication No. 5,* Committee on the Costs of Medical Care, 1930.
4. Reed, L. S. *The Medical Service of the Homestake Mining Company. Publication No. 19.* Committee on the Costs of Medical Care, 1932.
5. Falk, I. S., Griswold, D. M., and Spicer, H. I. *A Community Medical Service Organized under Industrial Auspices in Roanoke Rapids, North Carolina. Publication No. 20.* Committee on the Costs of Medical Care, 1932.

Scholastic Standing and Mouth Condition

IN 1912, Dr. Fones, of Bridgeport, Conn., found that 40 per cent of the children in that city showed retardation in their school work. He began the practice of dental hygiene on them, and 4 years later, the number of deficient children was reduced to 20 per cent.

In Atlanta, Ga., Dr. Sutton found that after the mouths of school children were put into healthy condition, the percentage of failures dropped from 22 to 8 per cent.

Recently, 164 junior high school boys in Minneapolis averaging 14 years of age were subjected to a similar experiment, 56 being among the best pupils of the school, 59 among the worst, and a third group of 49 were used as controls. The dental examinations were made with no knowledge of the scholastic standings of the boys. A careful record was kept and the mouth conditions graded as excellent, good, fair, or poor. Of 7 boys who had excellent teeth, 6 were in the group of excellent students, and only 1 poor, and of those having poor mouths, 5 were poor students, 3 were in the control group, and 1 was excellent. Of the excellent students, 70 per cent had mouths which were either excellent or good, while of the poor students, only 51 per cent were in these two classes. The study is being continued on larger groups and attempts being made to correlate the mouth conditions of the children with the occupational status of fathers.—Joseph T. Cohen, D.D.S. Scholastic Standing and Mouth Condition, *Mouth Health Quart.*, Jan., 1933.

Suggested Method of Computing and Standardizing the Maternal Mortality Rate*

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SINCE the publication of my original paper [1] on this subject I have had, from different parts of the world, several letters containing criticisms and suggestions regarding the proposed method of computing and standardizing the maternal death rate. As the method suggested necessarily involves some of the principles of the present method, a good share of the criticisms aimed at me also strike at the method now in vogue of arriving at the maternal death rate. My paper, then, has evidently served a twofold purpose.

The present work is the result of an attempt to rewrite the original article in simpler form, using as a guide the material found in those letters which my correspondents have kindly forwarded to me.

In the United States for the year 1928 the maternal death rate was 69 per 10,000 live births. For the same year in the Netherlands the rate was 34 per 10,000 live births. Does this mean that the pregnant woman in the United States actually runs double the risk of dying in childbirth of her sister in the Netherlands? Or might the difference in the two rates be due, in some measure, to variation in methods of computation?

Of late, considerable attention has been directed toward certain fallacies which may arise in the comparison of maternal death rates. The League of Nations has given several reasons why comparison of International Vital Statistics may lead to erroneous conclusions. The publications of the U. S. Bureau of the Census also caution the reader in this regard.

Hospitals, maternal welfare or visiting nurse organizations, etc., sometimes quote their maternal death rates and then commit the unpardonable error of comparing these "low" rates with the "high" rate of the country as a whole.

The death rate of the maternity hospital or organization is a *selective* and necessarily lower rate than that of the community or country of which it is a mere sample. There are two chief reasons for this: (1) the difficulty, especially in a large metropolitan center, of following to the end of 1 month after birth *all* women registered for childbirth; (2) the maternity institution being primarily concerned with birth of children has on its records a relatively small proportion of cases such as abortion, miscarriage, ectopic. However, the deaths from these, as well as the deaths of women not accounted for 1 month after giving birth, appear on the roster of the Board of Health.

* Read before the Child Hygiene Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

Yet from surveys such as these has emanated the widely disseminated assertion that in the United States 2 of every 3 maternal deaths are unnecessary.

Physicians actually in attendance on confinement cases terminating fatally often find it difficult to state on the certificate whether death was due to childbirth or to some complicating condition such as heart disease, tuberculosis, etc. His opinion as to the cause of death is final only if it agrees with the vital statistician's interpretation of the classification in the *International List of Causes of Death*. It is readily seen that the maternal death rate may vary with precision of application of the rules for allocation of causes of death, and this quite independent of number of deaths. In spite of this possible obvious disparity, the maternal death rate is computed to within 0.1 per cent.

The primary object of computing a death rate is to compare it with that of some other community or country. It is important, therefore, that if death rates of different areas are to be compared, first, all deaths must be included, and second, there must be some standard method of computation. The crude, general and true death rate is the result of computing the relation between the *exposure group*, or number of persons alive at the beginning of an interval of time, and the number in that exposure group who died during the *same* interval.

In case of the maternal death rate the method of computation is somewhat different. If in a given area in a given year, 668 women died of causes directly assignable to childbirth, and if during that year there were 121,462 babies registered as born alive, then the maternal death rate is 55 per 10,000 live births, as given by

$$\frac{668}{121{,}462} \times 10{,}000 = 55 \quad \ldots\ldots (1)$$

Because of the very incomplete registration of pregnancies which issue in the form of abortion, miscarriage, and ectopic gestation, there is no accurate record of the number of women in whom pregnancy terminated in less than 28 weeks. Since the number of live births from pregnancies under 28 weeks is very small, the exposure group in the definition of maternal death rate, 121,462 in equation (1) above, refers practically only to the last 12 weeks of pregnancy. The number of deaths, 668, refers, however, to the whole 40 weeks of pregnancy. The denominator of (1) is short the number of women whose pregnancy ended under 28 weeks. The effect of this is to give a relatively high value for the maternal death rate.

As the denominator, 121,462, of the fraction for getting the maternal death rate refers only to "live" births, it is readily seen that the rate would rise in proportion to deficiency in birth registration. The same thing might happen where the proportion of live births—of *all* births—was relatively low.

It is seen then, that the maternal death rate as defined in terms of registered live births, varies with the rigidity of application of the rules for allocation of causes of death; is overstated by its own definition; increases with deficiency of birth registration, and with the number of maternal deaths which occur before birth of child; very probably increases where the proportion of live births in all births is relatively low.

It is quite natural then that we should seek a method of measuring the maternal death rate which would be free of the variables mentioned above, which would conform to the definition of the crude or true death rate, and which could be used to make reliable comparisons, national or international.

Registration of births of gestation 28 or more weeks permits of a method

(q.v.) of computing the corresponding exposure group of women, which when related to the deaths in this *same* group gives the death rate of women in this span of pregnancy. But there still remains to be considered those women whose pregnancies terminate by abortion, miscarriage, or ectopic. The incomplete registration of these does not allow of calculation of the exposure group and hence of a true death rate. These deaths might be related to the number of non-childbearing females in the same age class, or they could be stated as a percentage of the total deaths for all periods of gestation. Employment of either of these two methods is merely making the best of the situation.

A woman pregnant 28 or more weeks is said to have a *viable pregnancy*. This class of women I have designated the *childbearing group*, or the exposure group.

The number of deaths in women in the childbearing group is, of course, the number of death certificates in women pregnant 28 or more weeks, on which certificates pregnancy or childbirth is given as *either the primary or contributing cause of death*. Pregnancy advanced to the period of viability, or even to the 5th or 6th month, is not likely to escape mention by the medical attendant. When necessary, further information as to period of gestation and whether death occurred before or after delivery, can be obtained by a supplementary communication to the physician. Generally speaking, this information is as available as any other data on the death certificate.

As practically all deaths related to pregnancy or childbirth have occurred by the end of 1 month after birth, we shall consider all deaths in childbearing women which take place during the pregnancy or within 1 month after birth.

The exposure or childbearing group is obtained from birth registration data and is the number of women in whom pregnancy terminated by live birth or stillbirth during or after the 28th week of uterogestation. Referring to these viable pregnancies, the number of women in the exposure group would be found by adding the live births to the stillbirths, deducting 1 and 2 for twins and triplets, and adding the number of women who died before giving birth.

Unfortunately, bureaus of vital statistics do not usually make a separate tabulation of stillbirths of gestation 28 or more weeks. Also, the number of multiple (twin or triplet) births listed may include cases of gestation under 28 weeks. On the other hand, the registered live births is a much more reliable figure and it can, when necessary, be corrected for any deficiency in birth registration. Furthermore a "live birth" practically always implies gestation of 28 or more weeks. Therefore, in case of live births, classification of these in terms of gestation is not necessary in arriving at the exposure group.

If bureaus of vital statistics would furnish separate tabulations for multiple births and stillbirths of gestation period 28 or more weeks, then the number of women in the exposure or childbearing group is very accurately and readily obtained. It should be remembered that most women bearing children can be just as accurate about the time of expected confinement as they are in regard to giving their age.

There is a second, and I think fairly reliable method of calculating the exposure group. It has no direct relation to plural births or to stillbirths. An institution such as a maternity hospital or maternity service can have, and usually has, complete record of *all* births as well as the period of uterogestation of each woman giving birth. If we deduct the number of women

whose pregnancies terminated under 28 weeks and then relate this remainder to the number of number of live births we can get a very useful ratio.

In Table I is shown a representative and aggregate sample of consecutive cases from 5 maternity services in greater New York, in the year 1930. The ratio of childbearing women to live births multiplied by 1,000 (column 3) is what I have chosen to call the "converting ratio."

The result for the converting ratio obtained in column 3 of Table I allows us to say, for the representative sample, that for every 1,000 babies born alive there were 1,110 childbearing women. Assuming, as we have done, that our sample is a representative cross-section of the whole city, then the number of women bearing children in New York City is found by multiplying the number of live births, 74,233, by the value of the converting ratio, 1,010/1,000, giving 74,975 (column 5).

Generally speaking, the proportion of live births in home confinements is probably comparable to that of the institution. It is true that the difficult cases are more liable to gravitate to the hospital, but it is also true that the hospital has more facilities for conserving life. As may be seen later, a fairly wide margin of error in the converting ratio gives rise to a relatively small deviation in the computed death rate.

In Table II the number of women bearing children, 74,975, when added to the number of women who died before giving birth, gives us in column 3 the number of women in the exposure or childbearing group, viz., 75,009. When the number of deaths from all causes in women in childbearing or exposure group, 246, is divided by the number of women in the group, 75,009, we obtain as is shown by column 5 of Table II and by the equation

$$\frac{246}{75{,}009} \times 1000 = 3.28 \ldots\ldots\ldots (2)$$

TABLE I

THE NUMBER OF WOMEN BEARING CHILDREN, OBTAINED FROM REGISTERED LIVE BIRTHS BY THE METHOD OF THE CONVERTING RATIO

New York City Ages 20-29 Year 1930

Representative Sample*			New York City	
Livebirths	Childbearing women	Converting ratio $\frac{\text{Column 2}}{\text{Column 1}} \times 1{,}000$	Live births corrected for deficient registration of 1 per 1,000	Women bearing children Column 4 multiplied by column 3 $74{,}233 \times \frac{1{,}010}{1{,}000}$
5,083	5,134	$\frac{5{,}134}{5{,}083} \times 1{,}000 = 1{,}010$ or $\frac{1{,}010}{1{,}000}$	74,233	74,975

* Aggregate sample of consecutive cases from maternity services in New York City in year 1930: Manhattan Maternity and Dispensary, Sloane Hospital for Women, City Hospital, New York Nursery and Child's Hospital, and the Methodist Episcopal Hospital of Brooklyn.

TABLE II

DEATH RATE IN CHILDBEARING WOMEN IN AGE CLASS 20–29 FOR NEW YORK CITY IN YEAR 1930

(1)	(2)	(3)	(4)	(5)
Women bearing children	Deaths before birth of child	Women in childbearing group	Deaths from all causes in childbearing women during pregnancy or within 1 month after birth	Death rate in childbearing group: Column 4 / Column 3 x 1,000
74,975	34*	75,009	246†	3.28 per 1,000

* There were 68 women in all age groups who died before giving birth. As about half the births occur in the age class 20–29, I have assumed likewise that about half the deaths, viz, 34, also took place at these ages.

† In the age class 20–29 there were 319 deaths in women at any period of gestation. Referring to all ages, of the total of 667 deaths, 515 or about 78 per cent were in women pregnant 28 or more weeks. On the assumption that the proportion 78 per cent holds good, approximately, for the separate age groups, 246 is found, by taking 78 per cent of 319. It will be seen then that this assumption will have the effect of slightly under- or over-stating the death rate in the separate age groups. In this series I have been given to understand that practically all deaths in women pregnant 28 or more weeks are listed as of maternal origin.

the death rate of 3.28 per 1,000 for women in the childbearing group.

In equation (2) we have an expression which conforms to the definition of the crude or general death rate. It is therefore the true death rate from all causes of childbearing women in age class 20–29. It is seen that the true death rate, so arrived at, involves no element of correction or personal equation. It depends only on standard data—age of mother, status in pregnancy, and relation of death thereto—all of which can be obtained by birth and death certification in any locality or in any country.

In making a comparative study of maternal death rates it is this general death rate in childbearing women to which we should direct our attention, rather than the corrected rate given in terms of live births which, as we have seen, can by its own definition, vary within wide limits.

In my original paper I did not compute rates for the separate age groups. For this I have been criticised and, I presume, rightly. It may be noticed, however, that this criticism has not been aimed at the present method, giving the rate in terms of maternal deaths per 1,000 live births.

The crude and general death rate for childbearing women in the age class 30–34 in New York City, 1930, I have computed in the same way and find it to be 4.69 per 1,000.

We have seen, for instance in the age class 20–29, that the 3.28 per 1,000 of equation (2) includes all deaths. If we use round numbers and regard the rate as 328 per 100,000 we may ask in how many of the 328 women death was caused by some complicating ailment such as heart disease or tuberculosis. How many of them would have died even if not pregnant? Or, what is the death rate in puerperal women from causes other than childbirth—the so-called normal death rate? If such a rate can be obtained and then subtracted from the general death rate in childbearing women the remainder is the death rate in women who died solely

TABLE III

New York City — Age Class 20–29

Childbearing Women		Married, Non-childbearing Women	
Number	(1) (a) 75,009	Total married women	(2) (a) 371,992
Deaths during pregnancy or within one month after birth	(b) 246	Married non-childbearing women 2 (a) **less** 1 (a)	(b) 296,983
		Deaths in married non-childbearing women Census figure less 1 (b)	(c) 1,041
Death rate (Applies for only 16 weeks of year)	(c) 3.28 per 1,000	Death rate in married non-childbearing women (Applies for whole year)	(d) 3.50 per 1,000

because of pregnancy and childbirth—the death rate *per se* due to pregnancy and childbirth.

In attempting to get a value for the normal death rate we should examine the death rate in a group of women identical with childbearing women except as to pregnancy and childbirth. We might then regard, for the particular year and age class, the death rate in married non-childbearing women. This data can be obtained from bureaus of vital statistics and from the census figures.

In Table III is shown the death rate in childbearing women and the rate in married non-childbearing women for the age class 20–29 in a given year. As may be found from actual computation, a wide margin of error incident to estimating the population for an intercensus year involves a relatively small deviation in the computed death rate.

If the death rate in married non-childbearing women is to be compared with that of the childbearing group we must multiply by 16/52. Then, by subtracting the two rates and placing them in equation form we have, for age class 20–29,

$$\frac{3.28}{1{,}000} - \frac{16}{52} \times \frac{3.50}{1{,}000} = \frac{2.20}{1{,}000} \quad \ldots (3)$$

$$\frac{328}{100{,}000} - \frac{108}{100{,}000} = \frac{220}{100{,}000} \quad \ldots . (4)$$

The interpretation of equation (4) may be given as follows, and is subject to the truthfulness of the assumptions used in obtaining the data for Tables I, II and III: In New York City in the year 1930, referring to age class 20–29, of every 100,000 women who entered the 28th week of pregnancy, 328 died during pregnancy or within 1 month after birth. In that 328 there were 108 whose primary cause of death was not pregnancy or childbirth, but rather some associated condition such as heart disease or tuberculosis; and of the 328, the remainder 220, died primarily because of pregnancy or childbirth. The rate, 220 per 100,000 childbearing women, is the death due to pregnancy and childbirth, *per se*.

For the age class 30–34 in the year 1930 in New York City the death rate *per se* was computed in the same way and found to be 352 per 100,000.

When this rate is compared with the 220 per 100,000 for age group 20–29 it is readily seen that the rate *per se* increases with advance of age, and this quite apart from the increase in the general death rate due to age.

In the original paper the deductive factor, represented as 108 per 100,000 in equation (4) in the present work, included all women who did not bear children during the year. One or two of my critics pointed out that inasmuch as the death rate in those physically or mentally unfit for marriage would be relatively high, the deductive factor would be correspondingly raised, and hence the death rate *per se* would be proportionately understated. With this in mind, I have made up Table IV.

On comparing the two values of the deductive factor for the same age class, in Table IV, does it seem to make very much difference whether or not the deductive factor takes into account marital status? Of course, Table IV represents only 1 year in New York City.

It will be seen that equation (4) is true only if the normal death rate in childbearing women (the rate of death from causes other than puerperal) equals the value of the deductive factor. The right to assume this has been questioned. James B. Russell and I are at present gathering some data pertinent to this matter and we are testing out a modified * form of equation (4).

We observe from Table IV, age class 20–29, that the rate of death *per se* is about two-thirds the crude death rate. If we were to compute the maternal death rates in terms of live births, we should also find approximately the same relation. In the age class 30–34 (line 2 of Table IV), the death rate *per se* is about one-quarter less than the crude death rate. There seems to be no reason to suppose that this excess of a quarter or a third would not also be true for deaths in women pregnant less than 28 weeks. The proposed method of computation then, may serve as a check on the present method. In view of the fact that New York City affords a real representative cross-section of a cosmopolitan population, and assuming that 1930 is very probably not different from any other year, may we hazard the guess that the maternal death rate as computed by the present method, is a quarter to a third overstated?

SUMMARY

It is thought that the present method of computing the maternal mortality rate, as the relation between maternal deaths and registered live births, is subject to several sources of error:

1. It varies with the precision of application of the rules for the allocation of causes of death.
2. It is overstated by its own definition.
3. It increases in proportion with deficiency of birth registration and with the number of maternal deaths occurring before birth of child.
4. It very probably increases when the proportion of live births—of the total of *all* births—is relatively low.

Because of the errors incident to computation of maternal death rates by the present method, the comparison of maternal mortality rates in different areas or countries may often lead to unwarranted conclusions.

Sweeping generalizations from rates in small samples usually lead to mis-

* Referring to women age x, let cQ'x be the death rate in childbearing women due to pregnancy and childbirth, cQx the normal death rate in childbearing women, ncQx the death rate in women not in the childbearing group; also let $cQx/\frac{16}{52}ncQx=K$, then the death rate due to pregnancy and childbirth *per se* for the last 12 weeks of pregnancy and first 4 weeks after birth is:

$$cQ'x=(cQ'x+cQx)-K-\frac{16}{52}ncQx \quad \ldots\ldots\ldots\ldots (5)$$

If the normal death rate equals the deductive factor, then K=1 and the equation becomes

$$cQ'x=(cQ'x+cQx)-\frac{16}{52}ncQx$$ which is the general form of equation (4) above.

TABLE IV

THE DEDUCTIVE FACTOR IN THE MATERNAL MORTALITY RATE, PER SE, NEW YORK CITY 1930

Components of the deductive factor	Age class	True death rate per 1,000	Deductive factor per 1,000	Mortality rate per se (per 1,000)
Married women not bearing children	20-29	3.28	1.08	2.20 (1)
	30-34	4.69	1.17	3.52 (2)
Married, single, widowed or divorced women not bearing children	20-29	3.28	0.98	2.30 (3)
	30-34	4.69	1.18	3.51 (4)

interpretation. It has been pointed out that the death rate of a country, state, or large center is the representative and nonselective rate while that of the maternity organization—hospital, visiting nurse service, etc., is necessarily a selective rate and one which does not represent conditions in general.

A low maternal death rate attainable in an institution in a large center does not imply that the rate for the country at large could be reduced to the same level.

Bureaus of vital statistics usually do not have record of the number of women giving birth. If these bureaus would make a separate tabulation of stillbirths and multiple births of gestation 28 or more weeks, the number of women pregnant 28 or more weeks (childbearing group) would be found by adding these live births and stillbirths to the number of childbearing women who died before delivery and then deducting one and two respectively for each set of twins or triplets. If these tabulations are not available, then the number of childbearing women in a given area may be obtained from the number of live births in that area by the method of the converting ratio as shown in Tables I and II.

The exposure or childbearing group of women, however gotten, when related to *all* deaths in that group, gives the crude, true and uncorrected death rate from all causes in childbearing women. It is this true and uncorrected death rate which should receive first consideration when national or international comparisons are made.

The death rate due to pregnancy and childbirth *per se* is calculated by deducting from the crude death rate the so-called normal death rate or death rate in childbearing women from causes other than puerperal. Generally speaking, the normal death rate in a country for a given age class should parallel the general or crude death rate (from all causes) in the same age class. It should be remembered that the maternal death rate in a certain country may be high partly because that country has a high general death rate in women of comparable age. It is in such a circumstance that the mortality rate due to pregnancy and childbirth *per se* has an important application.

In closing, let me state that the main object of this paper is the presentation of methods rather than the exhibition of death rates arising therefrom. It is hoped, at least, that the suggested scheme will stimulate a few individuals to further research. The author will gladly assist any workers who may have difficulty in applying actual data to the tables or equations for arriving at rates.

REFERENCE

1. Lowrie, Robert J. The Maternal Mortality Rate Computed and Standardized by a New Method, *New York State J. Med.*, Oct. 1, 1931.

Present Status of Handling Water Samples*

Comparison of Bacteriological Analyses Under Varying Temperature and Holding Conditions With Special Reference to the Direct Method

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ACCORDING to *Standard Methods of Water Analysis* of the American Public Health Association [1] the time required between collection of a sample for bacteriological analysis and the beginning of the analysis should not exceed 6 hours for impure water nor 12 hours for relatively pure waters; and during the period of storage the temperature should be kept between 6° and 10° C.; and any deviation from these limits should be so stated in making reports.

To determine to what extent and for what reasons deviations from this standard exist a questionnaire to each state and insular official [2] responsible for the water analysis of his particular area requested information on the use of ice in transporting and storing samples and the time elapsing between sampling and analysis. Fifty replies were received, only 2 insular authorities failing to respond.

Analysis of the replies indicates that the use of ice in the storage and transportation of water samples intended for bacteriological analysis is a rapidly declining practice. Fourteen states have given up the use of ice entirely, of which 5 are southern subject to fairly long seasons of summer heat, though none from the extreme South, and another after experimentation reports its intention to do so shortly. Including this state, only 11 state and insular laboratories reported the examination of iced samples only; 25 laboratories analyze both iced and un-iced samples, though in 6 of these the practice is tantamount to examination of un-iced samples. One or more of the following conditions govern the procedure in the other 19 laboratories:

a. Iced when collected by the Board of Health; otherwise un-iced
b. Iced in hot weather
c. Municipal samples iced, private samples un-iced.
d. Iced when not examined promptly.

The reasons given for the increasing use of un-iced samples may be resolved into the following points:

a. With modern transportation facilities, because of their size some of the smaller

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states and, through the establishment of branch laboratories, several of the larger states, feel that laboratory service has been brought within a few hours of all parts of the state.

b. Climatic conditions in some northern states preclude the need for ice.

c. Icing is expensive, often not practicable in remote areas, and frequently not carried out properly.

d. Un-iced mail samples have been found economical and practicable.

e. Many states do not ice if the analysis is carried out within 24 to 30 hours after sampling, since they consider icing necessary chiefly to safeguard the total counts on plates, which they omit except in certain technical controls.

No laboratory gave information as to the temperature of samples, iced or un-iced, at the time of analysis although several remarked that the use of ice had not been entirely satisfactory.

It is not improbable that the work of Berry [3] has considerably influenced this tendency toward the use of un-iced samples. He concluded:

The number of Colon group bacteria in samples of ground water did not change materially in the first 48 hours after collection regardless of whether the samples were kept at ordinary temperatures or packed in ice. Samples shipped without ice-packing will, therefore, yield dependable results and may be safely utilized where ice-packing is impracticable.

Not all the 50 laboratories answering the questionnaire gave information as to time elapsing between sampling and analysis, and many of the replies are open to misinterpretation. Of those making definite statements we interpreted that:

13 states begin analysis within 24 hours after collection

15 states within 48 hours

6 analyze samples sometimes 3 or more days old.

It is unquestionably true that despite modern transportation facilities, a considerable number of water samples are more than 2 days enroute and a large number are not examined within 24 hours.

In the study of possible contamination of water supplies from latrines bored or excavated into ground water, it was important that the recovery of the test organism should indicate the true character of the ground water being tested. To minimize uncertainties due to the shipment of water samples, we adopted the "direct" method as standard. Samples were inoculated into lactose broth (3, 10 c.c.; 2, 1 c.c.; and 2, 0.1 c.c. volumes) and plated in Endo (1 c.c.) on the field immediately after collection of the test samples and examinations were completed at the Field Research Laboratory. Because of the large volume of work involved it was not possible to incubate the cultures immediately on the field The time interval between inoculations and placing cultures in the incubator ranged from 15 minutes to 5 hours with an approximate average of 3 hours. Frequently atmospheric temperatures approximated 37° C. or were sufficiently high for growth. In any case direct inoculations served to fix the test volumes in culture before changes in water samples could occur.

Methods Compared—In view of the varying practices summarized in Part I, it seemed worthwhile to compare our findings by the "direct" method with analyses of samples collected at the same time but examined after being held for varying periods under temperature conditions representative of these procedures. Samples were, therefore, collected from the same source at the same time and treated as follows:

Direct (D), as indicated above

Iced (I), ice-packed when collected and examined within a few hours

Un-iced (U), held at atmospheric temperatures and examined simultaneously with the iced

Express-Iced (EI), ice-packed when collected and held for 24 to 30 hours before examination

Express-Un-iced (EU), held at atmospheric temperatures and examined simultaneously with the express-iced

There were 672 duplicate samples examined direct and iced only, and 316 by all 5 methods. Though occasionally iced samples were held for 7.5 hours, by far the greater proportion were examined within 4 to 5 hours. When atmospheric temperatures were high and the holding period brief, the final temperatures of the iced samples did not fall to 10° C., occasionally registering 13° to 15° C. The majority recorded less than 10° C. As frequently happens in the shipment of samples to central laboratories, in very hot weather the ice melted in 24 to 30 hours. The final temperatures of express iced samples were, therefore, higher at times than 10° C., in cold weather recorded a low of 4.5° C., and averaged 17.1° C. for quintuplicate examinations. Un-iced samples fluctuated from 15° to 36.2° C. The temperature of the ground water, varied from 16.5° to 25.0° C., averaging 19.9° C.

Source of Samples—We had the advantage of a more exact knowledge of our sources than is generally possible. The greater proportion of samples derived from pipe wells in our experimental fields afforded waters of varying quality: (1) good water, (2) yielding *B. aerogenes* (soil) from infected pumps,[4] and (3) receiving contamination or having been contaminated from experimental latrines. Group 4 includes a few samples from outside sources representative of water of poor quality contaminated from the surface and handling only—*i.e.*, from shallow, unprotected dug and driven wells and surface waters.

Method of Bacteriological Examinations—In addition to *Standard Methods* for confirmed tests, the methyl red, indol and citrate tests were routinely employed to differentiate the colon-aerogenes group (hereinafter designated C-A) into 3 standard types—*B. coli*, *B. aerogenes* and Intermediates.[5] In a very careful search for *B. coli*, streakings were made from 2 dilutions at the end both of 24 and 48 hours, if gas production warranted. In general a minimum of 4 to 8 colonies were picked according to gas production in varying dilutions. The presence of anaerobes of the *Cl. Welchii* type was confirmed. Pseudomonas complications were controlled by successive re-platings. In the examination of Endo pour plates, colonies were grouped into (a) "C-A reds" and (b) "Others"—tiny whites predominating among the latter. Since 1 c.c. was routinely employed to obtain an accurate picture of C-A reds, when other colonies exceeded 1,000 in number they were not further estimated but recorded as $>$ 1,000.

For simplicity we shall compare our

TABULATION A

Collections	#Samples	Method	Time in Hours		Temp. Water °C.		Maximum Air Temp.	
			Range	Ave.	Range	Ave.	Range	Ave.
185	672	D	0	0	16.0—19.5	16.7	11.0—28.0	22.0
		I	2.0— 7.5	4.5	2.0—13.0	8.6		
64	316	D	0	0	16.5—25.0	19.9	19.0—45.6	28.7
		I	1.0— 7.5	4.5	4.0—15.0	10.0		
		U	1.0— 7.5	4.5	17.0—34.9	25.7		
		EI	24.0—30.0	27.8	4.5—25.0	17.1		
		EU	24.0—30.0	27.8	15.0—35.8	26.9		

findings in terms (1) of the recovery of the C-A group as a whole, and (2) of its component member, *B. coli*.

THE FINDINGS

Direct and Iced Only—Since it had not been demonstrated that the direct method was feasible or would offer any advantages over iced samples inoculated within a few hours and incubated immediately, 672 duplicate direct and iced samples were analyzed. The very low recovery of lactose fermenters (1.0 per cent) and absence of C-A reds on pour plate from 604 duplicate samples of good water indicated that direct inoculations were practical. Contamination of cultures or plates in the field was not apparent. The recovery in 68 samples from wells receiving contamination suggested also that direct examinations were advantageous. The iced samples afforded 68 per cent of the direct recovery of the C-A group as a whole, and though a comparable number (95.5 per cent) yielded typical *B. coli* due to the gross contamination of receiving wells the C-A count on pour plate approximated only one-tenth.

Quintuplicate Comparison—Table I gives the numerical data for bacteriological analyses of samples in the different groups by the direct method, and compares the findings by the other methods in terms of the direct (percentage).

It is clear that in all groups the time interval before examination is of prime importance in the recovery of organisms of the colon-aerogenes group from water samples. Icing, though of secondary value, in general contributes definitely to recovery.

A. The direct method demonstrates its superiority by slightly higher gas production, significantly greater recovery of the C-A group as a whole, and notably higher yield of *B. coli*, evidenced not only by the greater

TABLE I

COMPARISON OF RESULTS OF BACTERIOLOGICAL ANALYSIS OF QUINTUPLICATE SAMPLES UNDER THE CONDITIONS INDICATED

Group	Wells	Collections	No. Sam.	Method×	No. Gas pos.	No. C-A pos.	No. B.c. pos.	Pour Plate Data			
								No. pos. C-A Reds	Total Reds	No. pos. Others	Total Others†
1	6	7	54	D	0	0	0	0	0	31	1,678
				Only occasional gas, no recovery of C-A group by any method.							
2	4	7	55	D	26	25	0	10	132	40	3,302
				I	61.5	60.0	..	50.0	8.3	102.0	140.0
				U	73.1	68.0	..	60.0	10.0	130.0	204.0
				EI	57.7	52.0	..	20.0	6.0	100.0	122.0
				EU	61.5	56.0	..	40.0	14.4	132.0	396.0 (2)
3	17	31	184	D	162	124	93	84	8,960	182	44,670 (16)
				I	92.6	80.6	59.1	63.1	20.0	98.9	58.9 (16)
				U	98.8	56.4	49.5	61.9	17.0	99.4	77.6 (18)
				EI	88.9	38.7	43.0	36.9	10.8	95.1	73.6 (17)
				EU	83.9	34.7	37.5	33.3‡	12.8‡	101.1	272.9 (92)
4	15	19	23	D	20	19	8	15	639	23	3,615 (1)
				I	95.0	94.7	87.5	100.0	70.6	100.0	205.7 (5)
				U	90.0	94.7	75.0	80.0	52.6	100.0	205.2 (5)
				EI	80.0	84.2	75.0	100.0	71.0	100.0	218.3 (3)
				EU	90.0	94.7	50.0	100.0	205.8	100.0	285.3 (5)
Total	32	64	316	D	208	168	101	109	9,731	276	53,265 (17)
				I	89.8	79.2	61.4	67.0	23.1	96.4	75.2 (21)
				U	94.2	62.5	51.2	64.2	19.2	107.2	92.5 (23)
				EI	85.6	45.8	45.5	44.0	14.6	96.4	86.7 (20)
				EU	82.7	44.6	38.6	50.0‡	44.8‡	112.3	288.8 (99)

× Numerical data for D; I, U, EI, EU expressed in terms of D (percentage).
† Number in ( ) indicates plates showing counts greater than 1,000.
‡ Discounting 29 counts from 124 plates in Group 3 not possible to indicate accurately.

percentage of positive samples but by the higher proportion of pour plates showing C-A colonies in greater numbers. There is progressively less recovery by other methods in the order: iced, un-iced, express iced and express un-iced.

B. Recovery from iced samples examined within a few hours is definitely and significantly greater than from the remaining 3 methods under the conditions of fecal or surface contamination usually encountered in the examination of water supplies. In handling samples yielding certain soil *B. aerogenes* only, icing apparently accelerates the death rate.

C. Though the difference in recovery of C-A organisms as a group from iced and un-iced samples held for 24 or more hours is slight, possibly because of the susceptibility of certain *B. aerogenes* to cold temperature, the yield of *B. coli* in favor of the express iced probably is significant.

Of special interest are the findings of 57 samples chosen from Group 3 from wells which, with 1 important exception mentioned later, had been consistently showing fecal *B. coli* derived from latrine contamination over a considerable period of time. With the exception of 1 sample showing gas due to anaerobes, the remaining 56 yielded *B. coli* upon direct examination in all samples, approximately 70 per cent in 1.0 c.c. or smaller volumes. The results are tabulated in Table II.

In these samples the standard iced method offered little better than one-half the direct recovery of *B. coli*, the un-iced express less than one-fourth, while the un-iced and express iced yielded approximately 33.0 per cent. Pour plates from samples, iced or un-iced, yielded approximately one-fifth of the direct C-A count when inoculated within a few hours and less than one-tenth when samples were held from 24 to 30 hours. In the un-iced express samples the marked loss in red colonies, 4.0 per cent of the direct, is in contrast to the increase in "other" colonies which were more than twice as numerous.

Among these wells one (X) is of particular interest. In contrast to the others this had been giving good water for approximately 2 months while pumping 40 gallons. In withdrawing 240 gallons fecal *B. coli* were pulled into the well, recoverable in all samples tested, yielding 1 to 6 *B. coli* per c.c. in 4 out of the 5 samples by the direct method. In this significant situation typifying a well affording consistently good water which under unusual conditions yielded dangerous contamination, the other methods contributed samples positive for *B. coli*, in 10 c.c. volumes only, as follows: iced 3; iced express 2; un-iced and un-iced express 1 each. A second well of this group showing gross contamination with *B. coli* in all 5 samples by the direct method, yielded *B. coli* also by the other methods, but in significantly less numbers evidenced by C-A colonies on pour plates: (D) 583; (I) 101; (U) 27; (EI) 37; and (EU) 26.

TABLE II

COMPARISON OF BACTERIOLOGICAL ANALYSES OF SAMPLES FROM WELLS ALL RECEIVING FECAL CONTAMINATION

Wells	Collections	No. Sam.	Method×	No. Gas pos.	No. C-A pos.	No. B.c. pos.	Pour Plate Data			
							No. pos. C-A Reds	Total Reds	No. pos. Others	Total Others*
12	18	57	D	57	56	56	39	827	56	20,696 (13)
			I	100.0	71.4	55.4	48.7	20.9	101.8	109.8 (16)
			U	100.0	44.6	35.7	41.0	23.0	101.8	108.6 (16)
			EI	100.0	33.9	32.1	25.6	6.1	101.8	129.0 (14)
			EU	100.0	32.1	23.2	20.5	3.9	101.8	206.7 (37)

* See Table I.

DISCUSSION

These results emphasize the points stressed by *Standard Methods of Water Analysis* that " because of the rapid and extensive changes which may take place in the bacterial flora of bottled waters when stored even at temperatures as low as 10° C., it is urged as of importance, that all samples be examined as promptly as possible after collection." Our series serves to emphasize anew the probable process of loss of bacteria significant of dangerous contamination—a rapid death rate of fecal organisms, particularly *B. coli*, and an increase in associated organisms. The particular wells mentioned support the general findings that in the light of results from direct inoculations the death rate of fecal *B. coli* in bottled waters is very rapid even within a few hours. Our results indicate that in bacteriological analyses of water receiving undoubted fecal and perhaps dangerous contamination the loss of recovery even with the iced samples examined within a few hours approximates 40 to 50 per cent, and there is progressively greater loss as the time of holding increases whether samples are iced or un-iced. It should further be stressed that in the examination of our samples the procedures involved a more thorough search for fecal organisms than usual in public health laboratories, and it follows that our findings probably show greater recovery than would obtain in the analyses of the same samples under routine conditions. Unless samples are inoculated directly, our results indicate the need of icing when waters are receiving significant fecal contamination and suggest that the increasing tendency to send samples un-iced is open to question. Though practical circumstances may make examination of un-iced samples necessary or even advantageous in handling certain waters, it should be emphasized that the practice derives sanction from expediency and does not conform in general to the conditions best for analysis.

CONCLUSIONS

We have found direct inoculation feasible. There is no question of the marked superiority of this method under any and all circumstances. We believe that with samples collected by state employees, particularly from water supplies of small villages and towns without laboratory facilities, in areas where bus transportation is available to carry cultures and plates to a central or branch laboratory for incubation within a few hours, direct inoculations are practicable. In water plants serving municipalities having laboratories, direct inoculations at the various stations could readily be adopted.

SUMMARY

An analysis of 50 replies received from state and insular laboratories indicates (a) that in most cases the procedure prescribed in *Standard Methods of Water Analysis* with respect to the storage and time of examination of water samples is not observed; (b) that a large number of water samples are not examined within 24 hours and a considerable number after 48 hours; (c) that ice-packing of water samples is rapidly declining. Comparison of recovery of colon group bacteria from iced and un-iced samples examined at varying periods indicates a very rapid death rate of *B. coli* in bottled samples of contaminated waters, which is progressively greater as the period of holding increases. Icing, though of secondary importance, offers a distinct advantage. Direct inoculations were found practicable and showed marked superiority over any other method. The feasibility of the direct method for municipal water supplies is suggested.

REFERENCES

1. *Standard Methods of Water Analysis*, Sixth Edition, 1925, p. 101.
2. *Pub. Health Rep.*, 46, 49 (Dec. 4), 1931.
3. Berry, Fred. Studies on Lactose Fermenting Bacteria. *A. J. P. H.*, 16:700 (July), 1926.
4. Caldwell, E. L. and Parr, L. W. Pump Infection Under Normal Conditions in Controlled Experimental Fields, 1932. In press.
5. Koser, Stewart A. A New Differential Test for Members of the Colon Group of Bacteria. *J. Am. Water Works Assn.*, 12:200, 1924.

Record Forms for Public Health Nursing

IN 1925 the Records Committee of the National Organization for Public Health Nursing drafted a set of nursing record forms so designed that the nurse might work with the family as a unit. The forms were put out with the understanding that they would be revised from time to time to meet the changing needs of the public health nursing field.

These forms have just been revised as a joint project of the American Public Health Association Sub-committee on Record Forms and the National Organization for Public Health Nursing Records Committee. As the forms are to be included as part of the standard forms for public health work to be recommended by the A.P.H.A. Sub-committee on Record Forms, the terminology and general set-up of the records conform to those of the other forms for reporting health work.

The plan of the 1925 Record System has not been changed in this revision; the record forms are again planned to enable the nurse to work with the family as a unit, and, in most instances, they are to be used with the family folder. However, individual records are so designed that it is not necessary to use the family folder and any record may be used by itself.

The significant features of the record forms are:

Provision for a definite content of visit by listing the conditions which must be watched in making an effective visit.

Provision for the minimum amount of writing by the nurse, by listing on the forms the items which may be checked, or by using a code suggested on the record, to give the desired information.

Provision for entering on certain forms, summaries of conditions found and care given, either when the case is closed, or periodically if patient is under care for a long time.

The Record System includes the following forms. An asterisk indicates those forms which have not been changed in this revision.

- Index Card *
- Family Folder
- Maternity Service
  - Maternity Record—AP–Del –PP – NB (double form)
  - Maternity Record (Prenatal Service)
- Morbidity Service
  - Morbidity Record
  - Continuation—Morbidity
  - Record of Care *
  - Tuberculosis Record
  - Tuberculosis—Record of Visit (double form)
- Health Supervision Service
  - Child Health Supervision—Infant—Preschool (double form)
  - Medical Conference Record *
- Extra Data *
- Nurse's Daily Report *
- School Service
  - School Health Record
  - School Nurse's Record of follow-up
  - Nurse's School Report *

The following is a brief description of the various forms and of the revisions made:

Index Card—This is an individual identification card which is used to determine whether the individual is or has been under care.

The Family Folder—This form is designed to give a complete record of the family. The face of the form provides spaces for entering facts about the social history and the environment of the family. Certain items which are considered necessary only under special conditions are starred to indicate that information regarding these may not be entered for every case. The inside of the folder provides space for a summary of services given to individuals in the family.

It is recommended that a family folder be used for health supervision and when any social or economic problem is indicated. It may or may not be used when there is no social or economic problem.

The only revision on this form is the addition of certain items particularly applicable to rural areas.

Maternity Service—The *Maternity Record—AP – Del – PP – NB* is designed for use during the complete maternity period. Space is provided for entries during prenatal and postpartum care and for facts relating to delivery. Space is also provided for entries on care of the new-born infant during the postpartum care of the mother.

The principal revision in this form is the rearrangement of conditions to be watched for in making an effective visit. Some few items have been added.

The *Maternity (Prenatal Service)* is a new single form designed for agencies, especially health departments, which are interested primarily in prenatal care.

The set-up of this record is the same as that of the maternity record for complete care.

Morbidity Service—The *Morbidity Record* is to be used for care of illness; non-communicable and communicable other than tuberculosis. If used for communicable diseases, information required by health departments may be entered under remarks.

The *Continuation-Morbidity* is the same as the reverse side of the Morbidity Record.

The principal change in these two forms is the provision of definite space for entries under " Physician's Orders."

The form *Record of Care* sometimes known as " bedside notes " is to be left in the home and is used by all who are caring for the patient.

The *Tuberculosis Record* is intended for use in all diagnosed cases. It may also be used for suspicious or undiagnosed adult cases. Such cases should be flagged or otherwise specially marked. Contacts and predisposed cases among children should be recorded on the special health record forms for their age groups, these records also being specially marked.

This form is planned to provide entries throughout the period of illness. Space is allowed on the reverse side for periodic summaries. Yearly summaries are recommended but the interval between summaries will vary according to type of case carried.

The *Tuberculosis Record of Visit* is to be used with the Tuberculosis Record and is a double form. The conditions which are to be watched in making an effective visit are listed and space is provided for supplementary notes on conditions, instructions and care given, and for physician's orders. The principal revision of these two forms is the provision for entries on information in relation to family and household contacts.

Health Supervision Service — The form *Child Health Supervision—Infant —Preschool*, is designed to be used for the health supervision of both infants and of children of the preschool age. Three forms, Child Health Supervision Record, Child Health Supervision—Infant—Record of Visits, and Child Health Supervision—Preschool—Record of Visits, have been combined in one double form. The periodic summary which was on the Child Health Supervision Record has been discontinued, as it was found to have little value in actual practice.

The first sheet of the new form provides space for identification data, disease experience, and for immunization and tests. Conditions to be noted in making an adequate visit are listed on sheets 2 and 3. The items listed included those applicable to the care of both infants and preschool children.

Space for physician's orders is provided on the 4th sheet. This form may be used either for visits in the home or for visits to a health conference.

The *Medical Conference Record* is for use of physicians at medical conferences. It is expected that a new form will be drafted by the A.P.H.A. Sub-committee on Records.

Nurse's Daily Report Sheet—This is planned to give a picture of the nurse's day and also to serve as a basis for making up the monthly and annual reports on staff activities. A revised draft is now being worked on by the two Records Committees.

School Nursing Service—The two forms, *School Health Record* and *Nurse's School Record of Follow-up*, take the place of the form on School Health Record. The revised School Health Record is designed to give a picture of the health of a school child over a period of years and a summary of the school nursing service in relation to the child. It is expected that this form will follow the child from school to school.

The School Nurse's Follow-up is designed for entries by the school nurse of her services in relation to the school child and for entries of facts regarding the health of the child during the period of a school year. It is intended that at least a yearly summary of this information will be made on the School Health Record. The School Nurse's Follow-up may then be destroyed.

The *Nurse's School Report Sheet* is designed to give a picture of the school nurse's day and also to serve as a basis for making up monthly and annual reports on the nurse's activities in connection with schools. It is expected to revise this form at some later date.

GENERAL COMMENTS

The record forms just described have been published although they are not copyrighted. It is hoped that agencies in planning their own forms will follow the same general plan as the published ones so that public health nursing records throughout the country will tend to be uniform.

The published record forms, except for the Family Folder and Index Card, are on 5″ x 8″ bond paper. The index card is a light weight 3″ x 5″ card. The Family Folder is an 8″ x 10″ very tough manila folder which folds as a 5″ x 8″ container in which all the individual case records of the family may be kept.

The forms are available from Mead & Wheeler Co., 610 South Michigan Avenue, Chicago, Ill. The price list and a sample set will be sent directly by them to anyone on request.

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DOES HEATING INJURE THE NUTRITIVE PROPERTIES OF MILK?

THE artificial feeding of children and infants is a necessity as well as an accepted fact, as is also the use of cow's milk for the purpose, to the practical exclusion of that of other animals. There are some who advocate the use of raw, some pasteurized, some boiled, and others dried milk, and all of these can give reports which are favorable.

In spite of the extensive literature dealing with almost every phase of artificial feeding and almost every type of milk, there is very little that can be used to make a fair comparison between raw milk on the one hand and heated milk on the other. Volumes have been written on pasteurized milk. Its value in the nutrition of children, in preventing gastrointestinal disturbances, and in stopping epidemics can certainly not be denied. Some experiments are entirely unfair; one, for example, in which a group of 122 infants fed on certified milk were compared with 112 fed on pasteurized milk, both milks having been boiled, is certainly not of much use, since the certified milk was of the highest quality, and the pasteurized of ordinary quality. An experiment on a large scale was done in 1930, in Lanarkshire, Scotland.[1] In this, 5,000 children were given raw milk and 5,000 pasteurized, all of the same grade originally. The investigators concluded that as far as growth, weight, and height were concerned, the results from the two milks were equal. The only clear conclusion which could be drawn from this work was the value of the milk ration in improving the nutrition of the children. The extensive coöperative experiment carried out in this country,[2] and reviewed in our issue of December, 1932, also showed, as far as it went, that there was practically no difference between the groups fed chiefly on raw milk, and those chiefly on heated milk, as regards the average heights and weights.

In regard to dried milk, which seems to be increasing in popularity, it can again be said that there are no experiments on record which enable us to make a clear-cut comparison between it and pasteurized or raw milk. The changes produced in drying are probably closely allied to those due to pasteurization, though the temperatures reached by the two processes in general use are probably higher than those ordinarily used in pasteurization, and may vary considerably. However, the testimony of experts who have observed the feeding of children with dried milk for many years is that there is no evidence of nutritional loss, so we must believe that the chemical changes do not have much clinical significance.

An unusually clear and judicial study of the question [3] points out, what is so well known, but often forgotten, that cow's milk is adapted for the nutritional requirements of calves—not children—and takes the ground that it is perfectly possible that the slight changes produced by pasteurization are beneficial to children rather than otherwise, making it more nearly like human milk. "There is nothing sacrosanct about the composition of cow's milk in relation to man."

The actual changes in milk produced by pasteurization are an increase in insoluble calcium of about 6 per cent, a reduction in the iodine content of about 20 per cent, and some destruction of vitamin C. Milk is not rich in vitamin C at best, though the amount is usually adequate for nutrition, but in actual practice, it is generally supplemented both for raw and pasteurized milk.

In considering the effect of these changes, it may be that pasteurized milk is not as suitable for certain animals whose calcium needs are greater than those of calves, but it seems there is no evidence that this is injurious to infants whose calcium needs are lower. The pasteurization of cow's milk brings it somewhat nearer to human milk as regards available calcium and phosphorus, and the change may be regarded as beneficial. Animal experiments as well as nutritional experiences on a large scale certainly give no support to the idea that pasteurized milk is in any way inferior to raw for infant feeding. These statements may not be entirely true for older children, since they require a greater amount of calcium for bone formation, and this is especially true for those who may be on a diet that is otherwise deficient in calcium, but apparently there is at present not much evidence on which to make such an assertion.

We have an immense volume of clinical evidence gathered from many countries which shows that pasteurized milk has fulfilled the needs for the feeding of infants and children over many years, with no evidence of damage, provided the possible loss in vitamin C is made good. The author above referred to holds that in view of this mass of clinical experience, it is up to opponents of pasteurization to demonstrate nutritional harm done by the process, and points to the fact that such experimental work as has been done proves that they have conspicuously failed to do so up to the present.

When we add to this the marked lessening of intestinal troubles and contagious diseases carried through milk, it is hard to understand how any opposition to pasteurization can be justified.

REFERENCES

1. Leighton, G., and McKinlay, P. L. *Report to Department of Health for Scotland, 1930.*
2. Frank, Leslie C., *et al.* Do Children Who Drink Raw Milk Thrive Better Than Children Who Drink Heated Milk *Pub. Health Rep.*, Sept. 23, 1932.
3. Savage, William G., M.D. The Effect of Pasteurisation upon the Nutritive Properties of Milk. *Lancet*, Mar. 4, 1933, p. 485.

COMMON SENSE IN HEALTH PROPAGANDA

PRESUMABLY everyone who has studied the question of health propaganda has realized that a certain amount of harm can be done by unwise health preaching. Many people are more or less ill balanced, and just as the medical student, according to the old saying, has for a while every disease which he studies, so do nervous persons suffer from imaginary dangers and diseases. This view is certainly not a new one, since many years ago it was held that writing concerning disease in ordinary language instead of in classical Latin would increase both real and imaginary illnesses.

For some years there has been no lack of medical and alleged medical information given to the public by the daily press. Many organizations which have done a vast amount of good have with the very best intentions put on campaigns for the instruction of the public. Periodical medical examinations have been urged by the highest authorities, and it is hard to doubt that they have had on the whole a good effect. On the other hand, it seems equally certain that some people have been frightened, and that there has been at least a tendency to make the public "disease-conscious."

Apparently the laity may very well question the sincerity of the medical profession in this movement. Though every doctor has capable professional friends always ready to give every examination possible free of charge, how many of them avail themselves of their opportunities? Do the wives of doctors suffering from cancer of breast, for example, come to the operating table sooner than other women? If not, why not? Many clinicians doubt the propriety and value of periodical medical examinations, though recognizing the value of early diagnosis, especially in diseases like tuberculosis, cancer and conditions characterized by albuminuria and high blood pressure.

A thoughtful and wise presentation [1] has recently appeared in which the ground is taken that in this matter of health propaganda, the practitioner and the health officer should work in closer coöperation. There is no question that many of the propositions put forward on this subject come from those who do not know sick people, whether or not they are graduates in medicine. The clinician on the other hand, and especially the old time family doctor, knows human nature and sick people as the laboratory man and the layman can never do, and his advice is correspondingly valuable.

Just how far it is advisable or wise to frighten a person depends largely upon the individual. No less an authority than Sir Thomas Horder has recently said, "Concern about high blood pressure is one of the chief factors in maintaining it, and this holds good whether the concern be on the patient's part or upon the part of the doctor." Another man of long experience has said that many young women are being frightened out of having children. This might have been understood before the days of antisepsis, and though even now maternal mortality is too high, generally speaking, child birth is reasonably safe.

Another instance is the propaganda for early diagnosis of cancer. Many people, especially women, spend their lives dreading cancer. Here there seems little doubt that the propagandists have exaggerated somewhat for the purpose of putting the point over, as well as enlisting the sympathy of the philanthropists in order to raise money for a purpose which unquestionably has a sound foundation.

Our local, state, and federal health authorities must continue to preach public

health and to give out interviews through the press and over the radio. These are now well recognized and widely practised procedures. We may well ask what effect they have had on the general health. The answer is that for most people it has been good, though we recognize that some phobias have been induced.

Many believe that the future control of contagious disease lies largely in prophylactic vaccination, and all over the world, efforts are being made to discover vaccines. Concerning these, when they are discovered, as well as for those for which vaccines are already known, there must be given to the public information accompanied by advice which may be so urgent as to partake somewhat of the character of compulsion. How should such a campaign be carried out? The highest success has been attained by enlisting the aid and coöperation of the family physician—in other words, the clinician. It is a matter of wisdom for the health officer to keep in close touch with those who reach the largest proportion of the population, to consult with them, and to accept their advice. Any antagonism which may be aroused seriously injures the cause which the health officer has at heart, and may result in a large degree of failure, not only for that particular scheme, but for others of like character elsewhere.

REFERENCE

1. Barber, Hugh, M.D. Clinical Wisdom and Health Propaganda, *Brit. M. J. Supplement*, Oct. 8, 1932, pp. 196–197.

DEFEAT OF PASTEURIZATION IN MANCHESTER, ENGLAND

FROM England comes the news that Manchester by popular vote has rejected the compulsory pasteurization of milk. An English journal [1] says that only 13.2 per cent of the electors voted, and yet we are told that this was the heaviest balloting ever recorded on a vote of this description. The editor makes very strong comments on the futility and foolishness of submitting any question of public health to the popular vote, saying very properly that the public is not in a position to understand such matters, not having been trained technically to deal with them. He holds that the Public Health Act of 1875, which is generally regarded as one of the finest pieces of public health legislation ever enacted in the world, would have failed of passage if the provisions had been submitted piecemeal to popular vote, and feels that even today most of them would be rejected if subjected to such an ordeal.

The Manchester Corporation Bill provided that all milk other than certified and Grade A (Tuberculin-Tested) coming into the City should be pasteurized. It is stated that 75 per cent of the milk supplied to Manchester is already pasteurized, that the City Council issued 350,000 explanatory leaflets for the education of the public, and that 323 children are infected with bovine tuberculosis every year, at a cost for treatment to Manchester of $90,000. In 1929, of a total of 1,133 samples of milk, 111, or 9.8 per cent showed tubercle bacilli. Of mixed milk samples from 697 farms examined during the same period, 88, or 12.62 per cent gave positive results. The corresponding figure for London in 1929 was 7.5 per cent. We have learned from the People's League of Health, as well as from other sources, that some 40 per cent of the herds in England react to the tuberculin test, that 2 per cent of the milch cows have tuberculosis of the udder, and that 14 per cent of market milk yields living tubercle bacilli.

Against such facts, the argument was used that compulsory pasteurization would drive the small producer out of business, that children prefer raw milk, and that it is more nutritious, since pasteurization precipitates calcium and destroys the vitamins. In the face of this, we have a declaration from the Minister of Health that pasteurization " ensures a milk which is not only safe but also retains its food value practically unimpaired." The Public Health Committee of the Town Council approved the Bill submitted and apparently did all they could to have it passed.

In a scathing editorial, the publication referred to [1] makes the statement that if the voters had possessed the requisite technical knowledge, their vote would have been one of censure not only of the health committee, but of their official adviser, the medical officer of health. We are told further that the great majority of distributors in England are now in favor of pasteurization, and that two of the large associations are made up almost entirely of those who pasteurize milk. However, what is described as a small minority was enabled to defeat this measure for the protection of the public, and the Corporation of the City has no alternative than to accept the verdict of this poll.

In 1899, the Corporation of Manchester obtained the passage of a Local Act which gave them power for the control of milk produced outside of the City and suspected of being infected with tubercle bacilli. The " Milk Clauses " were later incorporated in about 100 Local Acts which enabled the authorities to trace infected milk back to the farm from which it came, and to prohibit the sale of milk from animals in such areas. In 1914,[2, 3] these Local Act clauses were repealed, and in 1915, reënacted in the Milk and Dairies (Consolidation) Act, the enforcement of which was postponed on account of the World War until 1925. The procedure finally adopted seems rather cumbersome, but unquestionably protects the public as well as the dairyman. That it was not satisfactory is shown by the figures quoted concerning tuberculosis, by the apparent necessity for the election just held, and by the statement,[2] " The Manchester Clauses and the provisions of the Milk and Dairies (Consolidation) Act, 1915, which superseded them, appear to have had but little effect upon the incidence of bovine tuberculosis or the sale of tuberculous milk."

There seems to be little doubt that America has progressed further than England in regard to the handling of milk, though apparently we have much less tuberculosis in our herds. Nevertheless, in various parts of the country, fights are being made on the tuberculin testing of cattle as well as on the pasteurization of milk. Indeed, there is an association which is spreading propaganda for the use of raw milk as against pasteurized, in spite of the many proofs of the benefits of pasteurization to the safety and health of the people, especially infants, children and invalids.

REFERENCES

1. *Med. Off.*, Feb. 11, 1933, p. 52.
2. A Memorandum on Bovine Tuberculosis in Man, with Special Reference to Infection by Milk. *Reports on Public Health and Medical Subjects, No. 63*, 1931. Ministry of Health. London: His Majesty's Stationery Office.
3. Porter, Charles, and Fenton, James. *Sanitary Law in Question and Answer.* London, 1932.

The Scottish Rite Cathedral

INDIANAPOLIS

A.P.H.A. Convention City for 1933

INDIANAPOLIS, the capital city of Indiana, is situated in the heart of the United States. Its accessibility makes it an ideal location for the Sixty-second Annual Meeting of the Association.

Indianapolis has innumerable points of interest and an historical background of unusual significance to the visitor. The first thing one notices in the downtown district, the Cross-roads of the Nation, is the Soldiers' and Sailors' Monument in the Circle. Erected shortly after the Civil War on the site of the home of the first governor of Indiana, this fine dignified shaft, which is second in height only to the Washington Monument in Washington, is the axis around which the rest of the city rotates, and the observer will note other points in which the city resembles in appearance and character the national capital. Like the City of Washington, Indianapolis was not born; it was legislated. Seven years after the admission of the state of Indiana to the Union, Indianapolis was selected as its capital, and was surveyed by a competent engineer who had assisted in planning the City of Washington.

Quite the outstanding landscape and architectural feature to be observed from atop the Monument at the present time is the massive structure that has been completed in the center of five downtown city blocks, the Memorial Plaza to Indiana's participation in the Great War, which involves the expenditure of approximately fifteen million dollars. The Memorial proper is a square shrine with a pyramidal dome ninety-six feet high.

Indianapolis is the home of Booth Tarkington, celebrated author and playwright, and Meridian Nicholson, whose fame is equally widespread. William Herschell, the "Indiana Poet," claims Indianapolis as his home, and, too, Indianapolis holds the Shrine to which thousands of children and grown-ups make pilgrimages, the home of the poet, James Whitcomb Riley. It is a modest red brick house on Lockerbie Street, a stone's throw from the Murat Temple and Theatre, one of the largest Masonic structures in the United States. The house contains the furniture which he had used, and his unpretentious, book-lined study recalls memories of his oft-repeated works. The house has been set aside as an Indianapolis institution, and is being preserved to posterity.

Architecturally, Indianapolis ranks among the first cities of the land. The Public Library is conceded to be quite the finest example of severe Greek architecture in America. The Federal Building, which occupies the entire block between New York, Pennsylvania, Ohio, and Meridian Streets; the City Hall, the new Chamber of Commerce Building, facing University Park; the new National Headquarters of the American Legion in the Memorial Plaza; the Indianapolis Athletic and Columbia Clubs; and the National Guard Armory; these and some of the finer business buildings, banks and hotels are far above the level of the usual municipal architecture. The Scottish Rite Cathedral has attracted international attention as a reproduction of Old World architecture. The

Home of James Whitcomb Riley

Indianapolis Motor Speedway

interior is as striking as the exterior. Its central tower is equipped with Carillon bells which are said to be among the finest in America.

Indianapolis has devoted much time and money to the development of an elaborate park system. The Taggart Riverside Park and Garfield Park are worthy of particular attention. The latter's sunken gardens, with their varicolored illuminated fountains, are of great interest to visitors.

Ten miles to the north of the city is Fort Benjamin Harrison, the United States Army Post, which now houses the troops of the 11th Infantry and an aerial squadron; and approximately five miles to the north and west is the Indianapolis Motor Speedway, the greatest track in the world. The Speedway is a two-and-one-half mile brick oval and is to motordom what Churchill Downs is to lovers of the Derby. It is the scene each Memorial Day of the 500-mile sweepstake which has been responsible for more advances in motor development than any other influence.

Indianapolis has a population of approximately four hundred thousand people. More than two million people live within two hours' ride of it, and more than sixty million more can reach the city over night. The railroads have provided through pullman service from practically every railroad terminal of any size in the United States. Seventeen steam lines, and more than a score of bus lines converge here. Indianapolis acts as a hub to a number of trunk lines including the C. I. & L., Big Four—New York Central, Pennsylvania, B. & O., Illinois Central, and the Nickel Plate Railroads.

Indianapolis is as easily accessible by

automobile as by train. It is the intersection of two transcontinental motoring routes of the United States arterial highways systems and the converging points of a number of hardsurfaced national and state roads. The state of Indiana, as a whole, has long been known for her wonderful highway system and has acquired the title of "The Tourists' Paradise." The transcontinental routes are the National Old Trails Road from Washington, D. C., to Los Angeles, and the Pikes Peak Ocean to Ocean Trail from New York and Philadelphia to San Francisco.

There are many things of scientific interest to the health worker in Indianapolis. They will be covered in detail in a subsequent article.

State and local officials are already preparing to receive delegates to the Sixty-second Annual Meeting, October 9–12. They unite in a hearty invitation to members of the Association, their families and friends to attend.

The Local Committee in Charge of Arrangements is an impressive group of medical, health, civic and social leaders all pledged to make the Indianapolis Annual Meeting memorable.

LETTER FROM GREAT BRITAIN

THE FIRST LINE OF DEFENCE

Though here, as elsewhere, the central government health department, the Ministry of Health, is responsible for the conduct of international health relations, ever since 1875, when the line of organization was laid down, the local authorities of the ports actually serve as the first line of defence against the entry of infection.

Sir John Simon, commonly regarded as the founder of the system now in operation, even though for long an officer of the central department, always held that safety would best be secured by leaving the work in the hands of the local authorities, empowering them to make all the necessary provision in the shape of hospitals, etc., the responsible minister issuing from time to time such rules, orders, and regulations for their guidance as appeared to be required. Power to the health minister to make orders, etc., alone or in consultation with other departments—the Admiralty, the Foreign Office, etc.—was given in the Public Health Acts.

At intervals new regulations have appeared incorporating new views, the result of progress or based upon decisions arrived at in international conventions, and so on, and the authorities at the ports and their officers have carried them out most effectively and efficiently.

The most recent to appear are the Port Sanitary Regulations, 1933. These were issued about the middle of February, and come into operation on May 1, 1933. Intended primarily to replace and consolidate certain orders and regulations made from time to time between 1907 and 1929, they include also provisions for carrying out obligations assumed under the International Sanitary Convention of Paris, 1926, for preventing access of rats to ships, and for the control of persons embarking in outward-bound ships who are suffering from infectious disease or who have been in such relations with persons so suffering as to render them liable to transmit the disease. Modern methods of international interchange of information relating to epidemic diseases are taken into account, and special measures are prescribed for

dealing with ships infected with typhus fever and smallpox, in addition to those infected with plague, cholera, or yellow fever, three diseases to which for long special regulations have applied. In addition to imposing duties upon the authorities, the regulations also lay down those to be performed by ship masters, customs officers, and the medical personnel of the local authorities at the ports.

The arrangements under which persons aboard foreign-going ships found to be infected on arrival are permitted to proceed to their destination, on providing particulars as to their movements and the address to which they are proceeding, for the information of the health officer of that area, are continued. Having regard to the fact that this system has proved eminently workable and a perfect alternative to quarantine of the older type, it is not surprising that it should have been continued.

VOLUNTARY MEDICAL AND SURGICAL SERVICES IN LONDON

A report of a survey of medical and surgical services in London, undertaken jointly by the London Voluntary Hospitals Committee and the London County Council, recently issued, contains an amount of information of distinct value and interest. The first part, for which the former body is responsible, contains reference not only to hospitals but to voluntary clinics and dispensaries.

So far as hospitals are concerned, these are divided into four groups: teaching hospitals (St. Bartholomew's, Middlesex, Guy's, etc.); other general hospitals containing a hundred beds or more; those containing less than 100 beds; and special hospitals.

In all, in the voluntary hospitals there are 14,833 beds. The total number of new in-patients treated in the year 1931 was 216,788. Of these, and in respect of whom information is available, 134,752 came from within the county of London, and 79,385 from outside the county. The proportion from outside the county is naturally greater in the case of the teaching hospitals, namely, from inside the county 59,307, and from outside 36,740. The same is true of the special hospitals, with 46,385 from the county, and 29,702 from outside.

The population of the county of London in 1931 was 4,397,003. The population of Greater London was 8,202,818.

Some indication of the work done in relation to in-patients is given by the fact that the voluntary hospitals have 239 operating theatres, and in one year 123,312 operations were performed on in-patients. New out-patients amounted to 1,596,361, and the total out-patient attendances in 1 year was 8,355,756, a number greater than the population of Greater London.

The information collected with regard to voluntary dispensaries is difficult to summarize, but speaking generally there appears to be in the London area a quite astonishing assortment of institutions of this type and very ready of access, more particularly from the poorer quarters in the different areas of the metropolis.

Municipal Hospitals, Clinics and Dispensaries—In part II, which treats of municipal hospitals, clinics and dispensaries, it is shown that in regard to the two last-named, the metropolitan borough councils have not been ungenerous, the provision including, in addition to tuberculosis dispensaries, infant welfare clinics, and such like standard institutions, clinics, for a wide variety of other purposes—diphtheria prevention, massage, etc.

So far as hospitals are concerned, the survey (part II) gives detailed information of the medical, surgical and other services provided in 1931 by the

council at the 79 general and special hospitals, convalescent hospitals, institutions and other places with beds for patients, and the 49 dispensaries (outdoor medical relief stations) under the management of the central public health committee of the council; at 8 of the 13 institutions under the management of the public assistance committee, in which are accommodated, for the time being, a number of chronic sick and other cases; and at the 20 mental hospitals, colonies, homes and institutions for the mentally defective under the management of the mental hospitals committee.

The number of beds for sick persons in the council's hospitals and institutions (apart from mental hospitals) on December 31, 1931, was 38,945. The total number of new in-patients treated in the year 1931 was 201,899. The total number of in-patients treated, based on discharges and deaths, in the year (excluding one convalescent hospital for which the figures are not available) was 210,074, of which all but 5,535 were resident in the county of London. New out-patients in 1931 (excluding special hospital cases) numbered 44,450, and the total out-patient attendances at all hospitals in the year was 259,036.

The total number of beds in the council's mental hospitals, colonies, homes and institutions under the management of the mental hospitals committee was, on December 31, 1931, 32,265.

Home and School Medical Services—In addition, there is provided a district medical service (*i.e.*, medical attendance on the sick poor who are not in receipt of indoor medical relief) and medical inspection and treatment for school children. The former is carried on by 100 part-time district medical officers and, in 19 of the 119 districts into which London is for the purpose divided, by whole-time officers of the staff of the council's general hospitals.

Patients are visited in their own homes by the district medical officers or seen by them at the 49 medical relief stations, or, in 21 districts, at the private surgery of the district medical officer. The number of domiciliary visits paid by district medical officers during the year 1931 was 65,604, and the number of attendances of patients at medical relief stations during the year was 257,910.

The council's scheme for school children includes agreements with voluntary committees, who have, at the instance of the council, provided 73 treatment centers, and with the authorities of 17 voluntary hospitals. The numbers of children treated under these arrangements in 1931 were, for minor ailments 106,072, for vision 44,686, for defects of the ear, nose and throat 20,703 (16,243 operations), and for dental defects 139,723, a total of 311,184.

The two parts of the survey bring into focus the whole of the hospital and associated provision made by voluntary agency and public authorities for the population of London. More important still, largely as a result of the setting up of the voluntary hospitals committee and the making of the survey, there has come about a better understanding between the two bodies, with promise of a greater degree of coöperation in the future with growth of mutual knowledge, and a mutual appreciation of the needs of each system.

One most important development, of which there are already indications, is that there will be made available for teaching purposes a great deal of the material in the municipal hospitals which the clinical teachers, if in fact they knew of its existence, formerly considered entirely out of their reach.

CHARLES PORTER, M.D.

London

ASSOCIATION NEWS

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.

Health Officers Section

Horace E. Duncan, M.D., Court House, Dallas, Tex., County Health Officer

Frank J. Jirka, M.D., 3202 W. 22 St., Chicago, Ill., Director of Public Health of Illinois

Eli M. Morehouse, M.D., Yankton, S. D., City Health Officer

Robert R. Robinson, M.D., 204 S. Garth Ave., Columbia, Mo., Boone County Health Officer

Laboratory Section

Louis H. Burgwald, B.Sc., Ohio State University, Columbus, O., Instructor in Dairy Sanitation

Arch H. Morrell, M.D., 18 Weston St., Augusta, Me., Director, State Diagnostic Laboratory

Carl Wilson, D.Sc., 207 S. Broadway, Los Angeles, Calif., Director of Sanitation, Department of Water and Power

Public Health Engineering Section

Robert N. Clark, C.E., 74 Eiseman Ave., Kenmore, N. Y., Sanitary Engineer

Charles D. Yaffe, M.S., 2830 Grant Ave., El Paso, Tex., City Sanitary Engineer

Food and Nutrition Section

Davis W. Fountain, City Dairy Dept., City Hall, Phoenix, Ariz., City Milk Inspector

Mrs. Gustavo Saliva Soria, Box 38, Marina Station, Mayaguez, P. R. (Associate)

Child Hygiene Section

Frederick L. Patry, M.D., State Education Dept., Albany, N. Y., Neuropsychiatrist

Public Health Education Section

Mary S. Close, A.B., High School of Commerce, San Francisco, Calif., Science Teacher

Harry L. Hopkins, 386 Fourth Ave., New York, N. Y., Director, New York Tuberculosis and Health Association

Katherine Sarabia, S.B., Massachusetts Inst. of Technology, Cambridge, Mass., Research Assistant in Health Education

Elvessa A. Stewart, A.B., Manila, P. I., Chief, Dept. of Home Economics, Bureau of Education.

Public Health Nursing Section

Alice F. Mitchell, Colchester, R. F. D., Conn., Secretary, Salem Public Health Nursing Association

Nora Moore, 22 Prince Arthur Ave., Toronto, Ont., Canada, Acting Director of Public Health Nurses, Dept. of Public Health

Grace W. Pinckney, R.N., 608 City Hall, Omaha, Nebr., Supervisor of School Nurses

Carolynn S. Whiting, R.N., P. O. Box 78, Phoenix, Ariz., Public Health Nurse

Epidemiology Section

John E. Laxton, M.D., D.P.H., Dept. of Public Health, City Hall, Toronto, Ont., Canada, Director, Division of Communicable Disease

DECEASED MEMBERS

Howard A. Lanpher, M.D., Des Moines, Ia., Elected Member 1923, Fellow 1932

Charles B. Maits, M.D., Pittsburgh, Pa., Elected Member 1929, Fellow 1932

Harry K. Read, M.D., Houston, Tex., Elected Member 1928, Fellow 1931

C. A. Shore, M.D., Raleigh, N. C., Elected Member 1909, Fellow 1923

Leonard M. Wachter, Albany, N. Y., Elected Member 1906, Fellow 1922

Albert L. Brannock, M.D., Pontiac, Mich., Elected Member 1925

Margaret M. Butler, Chicago, Ill., Elected Member 1928

Louis Cantor, Jerusalem, Palestine, Elected Member 1926 (Associate)

Anton J. Cermak, Chicago, Ill., Elected Member 1926

A. A. Crooks, M.D., Peoria, Ill., Elected Member 1925

Charles R. Grandy, M.D., Norfolk, Va., Elected Member 1907

Sylvan McElroy, M.D., Orlando, Fla., Elected Member 1927

PUBLIC HEALTH ADMINISTRATION

Health Department Reports

THIS section received more annual reports for 1932 during the first two months of the new year than heretofore. One of the values of the annual report depends upon its timeliness, hence the tendency for early issuance of these documents is commendable. While some of these reports have occupied less space than formerly and have omitted some of the routine statistical tables, they have in general been more carefully planned and more interesting to the average reader. Among the early reports are those for Colorado Springs, Detroit, Palama Settlement (Honolulu), Palo Alto, Pasadena, Middletown, O., Lincoln, Neb., Steubenville, O., Chicago, Peoria.

Colorado Springs—While an increase in the general death rate for the city is noted for 1932, this did not occur in tuberculosis nor in other common communicable diseases. The greatest increase was noted for the circulatory diseases, followed by certain respiratory diseases. Infant mortality was somewhat higher in 1932 than in 1931, the infant deaths from prematurity being most marked. There were 3 cases of diphtheria with no deaths in this city of 33,237. One of the increased problems associated with the depression is said to be that of supervision of the milk supply and of preventing the sale of " bootleg " milk. Increased efforts were necessary to discover and inspect the establishments of unlicensed milk dealers.

Palama Settlement, Honolulu—In Honolulu, the health and welfare center, known as Palama Settlement, maintained its watchword of " Prevention as well as cure " in 1932 and adopted the goal of " more work at less cost." Palama public health nurses increased home visits to 45,708, almost 9,000 more than in 1931. The doctors and dentists treated 78,629 cases, an increase of more than 11,000 over 1931. The newly organized Tuberculosis Committee carried the message of prevention to tens of thousands of island residents on Oahu, Maui, and Hawaii.

One-seventh of the energies of this center is devoted to recreation and the department served 15,000 of all ages. These services include: club activities, boy and girl scouting, home-making, physical education, swimming, athletic leagues, and social dancing. The center reached through all its services 200,000 during the year. An attractive, beautifully illustrated 4-page report tells the story.

A more detailed report of dental services shows that the Strong Foundation contributed some $30,000 to provide high grade dental treatment to 6,552 children, representing 57,396 treatments. These were children attending the first 5 grades of the public schools whose parents were unable to pay for private dental care. There were also 7,155 elementary public school children in the city who were under the care of private dentists. Only 6,184 children received no dental care. On the average, the cost of complete dental care per child, necessitating 3 visits each, was $4.01.

Palo Alto, Calif. — In presenting his 1932 report to the Board of Public Safety, the Health Officer of Palo Alto

made the following significant comments:

> Those activities which make for economy and efficiency possess the greatest opportunity to survive the readjustments through which governmental agencies are passing. True economy consists not so much in minimal outlays as expenditures that constitute sound purchases or investments. Often false economy results from failure to make the proper expenditure. . . . The best investment the community can make is in itself, its children, mothers, and citizens. . . . The city of Palo Alto has definitely been engaged in the public health business since 1910 when the full-time department was started. Each year since that time she has invested certain sums of money in her citizens in the shape of appropriations to the health department. The returns on these investments are set forth definitely and unmistakably in the annual reports of the department.

For the period 1910–1932, the average infant mortality rate was 41.6, or about half that for the state, and in 1932 the rate was 20.5. About 58.6 per cent of the school children and most of the babies have been immunized against diphtheria. There has been but 1 death from diphtheria since 1911 and none since 1921. A high grade milk supply is provided, with no milk-borne disease recorded in years. Laboratory service is available through the coöperation of the Palo Alto Hospital and the Health Department.

In 1931, Palo Alto was again an honorable mention city in the U. S. Chamber of Commerce Health Conservation Contest. Expenditures for health by all agencies amounted to $1.30 per capita. It is observed that the 5 honorable mention cities in California expended in 1931 an average of $1.94 per capita for health as compared with $1.12 per capita for the 13 cities in the state in the contest which did not receive awards.

Pasadena, Calif.—The 1932 Health Department report of 103 mimeographed pages is well prepared and effectively illustrated. Reports of coöperating agencies as well as of the Health Department are included. Pasadena has obtained honorable mention each year in its population class in the annual Health Conservation Contest of the U. S. Chamber of Commerce. The infant mortality rate of 34.9 and the maternal mortality rate of 3.7 are worthy of note. In connection with prenatal care, an arrangement has been made with attending physicians and local hospitals to furnish Wassermann tests without cost. Four conferences on maternal and prenatal care are maintained in this city of 80,000. During the year a careful study of the maternal care service was conducted and a community program was developed with the social agencies.

A survey conducted by the Los Angeles County Welfare Department, in which area Pasadena is located, indicates that there has been an increase of 30 per cent in the incidence of tuberculosis among persons under welfare care since the depression. The city tuberculosis program, through coöperation of several agencies, meets *Appraisal Form* standards.

The report calls attention to the work of 26 members of the Woman's Civic League who served as deputy food and milk inspectors without compensation during the year. Another interesting feature of the report is the rating schedule of the U. S. Chamber of Commerce properly filled out for Pasadena.

Detroit, Mich.—Under the title *Public Health in a Year of Stress* appears Detroit's annual Health Department report for 1932. That a new low general mortality rate of 8.7 and a new low tuberculosis rate of 70.3 were established, together with freedom from smallpox, is noteworthy. The diphtheria death rate of 4.3 is contrasted with that of 6.3 for 1931. There were but 57 cases and 9 deaths from typhoid fever, giving a death rate of 0.6. Also

commendable is the infant mortality rate of 52.3, which is less than half of the rate for 1920.

The question may well be asked as to why health conditions have been so good. It is true that, by and large, the death rate throughout the United States has reached a new low figure. Health departments have materially expanded their services during the past two decades; have extended their activities in the prevention of such diseases as smallpox, typhoid fever, and diphtheria, for which known prophylactic means are available; and have extended their activities to find the early case of tuberculosis, provide adequate diagnostic facilities, search for contacts and provide more adequate hospital and sanatorium facilities for known cases. Detroit now has two hospital beds for tuberculosis for each annual death and for the first time the list of those seeking admission has been eliminated. Health education has brought the message of positive and vigorous health, the value of the periodic health examination, and the need for early and prompt diagnosis to the attention of our citizens. It has taken years to stimulate this interest in positive health habits and it is reasonable to conclude that this widespread educational influence cannot be destroyed over night. In 1932 we continued to reap the benefit of the public health program which had been constructed during the past 20 years. The health of a community reflects the personal health of the individuals who constitute that community and the death rates are an indication of the health consciousness of our citizens. By force of circumstances many people have been deprived of those luxuries and extravagances of life which create over-indulgence and are not considered essential to health and well-being. They have been conserving those fundamental principles which assure a good health tone. Furthermore, the past year has been free of those epidemic diseases for which public health administration does not possess precise means of control. There has been no widespread outbreak of influenza with complicating pneumonias. We have lived more sensible lives with no excesses due to overwork and our daily habits have been seasoned with reasonable amounts of recreation, lack of over-indulgence in unnecessary foods, and freedom from excessive extremes in our mode of living. Briefly then, our new health record may be attributed to a general understanding of the principles of hygienic living coupled with such prophylactic services as are at our disposal and blessed by the absence of epidemic disease concerning which we know little.

In January, in order to balance the budget for the fiscal year, it was necessary to make certain curtailments in the program. It was deemed advisable to conserve those services which deal with the control of the acute communicable diseases, tuberculosis, and the venereal diseases, and the promotion of positive health for the mother, infant, and young child. As cuts in service became inevitable it was decided to curtail those activities which pertain to the higher age groups, especially those activities which might be replaced through the coöperation of other agencies. Consequently, the school dental service was eliminated in January with the exception of the director. The service has been maintained through the aid of the District Dental Society by 300 dentists who volunteered to conduct the dental examinations in the schools and by 60-some dentists who have manned certain of the treatment clinics. In October, the Children's Fund of Michigan appropriated $25,000 for dental relief and since that date has given emergency dental service in school clinics.

In January, the paid physicians who had conducted the physical examinations in the schools were eliminated and this service has been continued by the Wayne County Medical Society, which through an appropriate committee has officially joined hands with the Board of Education and the Department of Health in providing such examinations. One hundred physicians have donated their services and are giving on an average of one morning each second week. This work is directed through the County Medical Society by the director of the School Health Service who is still employed by the Department of Health on a full-time basis and likewise serves as secretary of the special committee of the medical society. Thus, these two services which by force of circumstances have been eliminated from the health department budget have continued to operate through the generosity of the physicians, dentists, and the Children's Fund of Michigan.

There have been no other major curtailments in service. The communicable disease activities have been maintained at full strength. The tuberculosis and venereal disease clinics have carried a heavier load than heretofore and there has been no relaxation in the services in maternal and infant hygiene. In August, all municipal departments were placed on a 5-day work plan, the employees engaged for 5 full days of the week, the majority not working on Saturday. The Health Department has, however, continued

to function 7 days of the week, those who are employed on Saturday and Sunday being granted appropriate relief on other days. The first curtailment in compensation was made in January with a reduction of 10 per cent in wages and for all receiving more than $4,000 annually, an additional 10 per cent. With the inauguration of the 5-day plan in August, an additional 14½ per cent reduction in salary went into effect. These reductions are carried in the budget as a salary suspension, there having been no reduction in the basic salaries. The public health nursing service of the department, so essential to efficient work, has been maintained at full personnel. Minor adjustments in certain activies have been made so as to maintain so far as possible the more fundamental services of the department.

In the face of these circumstances, the report properly raises the question of what the future may hold. If the city is deprived of existing facilities for searching out the early case of tuberculosis, the follow-up work of the public health nurse, adequate beds for hospitalization of the advanced case with positive sputum, which is a source of danger to child contacts, beds for the early case which can be arrested and reclaimed, there would inevitably follow an increase in the tuberculosis rate. Other examples are cited. Foremost in the services of the health department is considered the public health nursing personnel which has become the unit through which the health educational program is disseminated. The various health and social agencies are working closely together and the private physicians are participating actively in the preventive program.

Among the important activities of the year are described administrative and epidemiology studies of scarlet fever, a survey of over 200,000 children below 15 years of age as to the degree of diphtheria protection, health education procedures, the introduction of a new strain for tubercle bacilli, the preparation and distribution of convalescent serum, the introduction of milk on the city market fortified with vitamin D, and special measures for the education of food handlers. The last two pages of the report are devoted to a classified tabulation of health appropriations and to the number and distribution of personnel according to functions.

New Mexico—*The New Mexico Health Officer*, a quarterly bulletin of the Public Health Bureau, presents on its front cover a map of the state, with county divisions. Red dots on a yellow background effectively portray the location of 248 smallpox cases reported during the past 3 years.

According to a study reported the states which require vaccination before a child may enter school, had an average case rate per 100,000 of 9.5 for the years 1921–1926. The group of states in which laws make required vaccination impossible, had an average case rate of 102. In New Mexico, where vaccination is required, the average case rate in 1930–1932 was 20.9, but the 8 Texas borderline counties and one other had a case rate of 47.4. The remaining counties had a rate of 8.5.

The annual bureau of public health report for 1931–1932 omits detailed statistical tables, but effectively uses summary tables with interesting descriptive text. In recognition of the importance of treating syphilis cases, a portion of the financial aid received by the state from the Reconstruction Finance Corporation has been set aside for the purpose of buying drugs for treatment of indigent syphilis cases. Some doctors will give their services free for the work. The New Mexico Social Hygiene Association was formed during the year.

This annual report deserves credit for an interesting discussion of popular health education. Although no allowance was made for the work by the

Legislature, efforts to extend this service were made by the bureau "believing that it is a fundamental service to the people of the state." A newspaper service, with weekly articles, was inaugurated. Through the coöperation of the modern language department of the State University, these articles were also translated into Spanish for newspapers published in that language. Weekly talks were given over the radio. An effective monthly mimeographed bulletin was published as a medium of exchange for the ideas and experience of county health workers. Classes in public health were continued in university summer sessions. Public addresses were frequently given before men's and women's clubs, and a large quantity of health literature was distributed.

Illinois—The general health of the people of Illinois for the past 3 years has been distinctly superior to that which prevailed during any corresponding period in the history of the state, according to the report of the State Department of Public Health for the period July 1, 1930–June 30, 1932. The general mortality rate from all causes for the 3 years ended with 1931 was the lowest on record in Illinois for such a period. The decline in the infant death rate since 1928 has preserved over 4,000 infant lives which would have been lost had the most favorable conditions of any previous period prevailed. Declines in the tuberculosis, diphtheria, typhoid fever, and diarrheal diseases have been significant. Fully ½ million children were immunized against diphtheria compared with 300,000 during the previous 4 years. A survey covering 1 per cent of the population of the state was made to determine the completeness of reports of communicable disease.

The educational work of the department has been maintained on a high level. Through numerous public addresses, periodicals, special bulletins, radio, and newspapers, the public has been informed of matters of current health interest, warned against potential or approaching danger, and advised concerning preventive possibilities and timely precautions. Education exhibits have been developed. As a practical demonstration in sanitation, the Department of Health, with the coöperation of the Department of Agriculture and the State Fair management, undertook to make the Illinois State Fair a model project of the kind in respect to sanitary and hygiene matters. This involved the elimination of all insanitary conditions and practices and the medical examination of all food handlers. One typhoid fever carrier, engaged as a dish washer, was detected and removed from that occupation, thus eliminating a potential source of much illness.

Steubenville, Ohio—During 1932 there was an attendance of 499 infants at baby conferences, or double the number of the previous year. In coöperation with the local medical society, the Kiwanis Club, and school health service, the health department gave immunization treatments to 327 first grade children (45 per cent) against diphtheria. Public health nursing services numbered over 10,000. In this city of 35,422, an infant mortality rate of 64 is noted.

The 17th anniversary of National Negro Health Week was observed in April by all local colored organizations. The Booker T. Washington health unit was formed for the strict annual observance of this health week. General meetings in the recreation center and in local churches were held, health literature was distributed, and health talks given. The annual report, although mimeographed, is effectively illustrated.

LABORATORY

WHOOPING COUGH PLATES IN A PUBLIC HEALTH LABORATORY*

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IN an article published in 1916 Chievitz and Meyer [1] of the Danish Sero-therapeutic Institute described a method of obtaining cultures of *Hemophilus pertussis* from whooping cough patients through "seeding by projection of droplets" crediting the method to the suggestion of their "young colleague M. Emile Mauritzen." This method, commonly called the cough plate method, consists of holding a plate of suitable medium about 5 or 6 inches in front of the mouth of a coughing patient during a paroxysm to catch the material expelled from the deeper parts of the respiratory tract. In case the patient is not having actual paroxysms a series of deep coughs is induced. This method has proved of great value for the diagnosis and study of whooping cough in the hands of Danish workers over a period of several years. It was first used extensively in this country by Lawson and Mueller [2] of the Commission for the Study of Whooping Cough at the Boston Floating Hospital in 1925–1926 with favorable results, and more recently has been highly recommended by several authors, especially Sauer and Hambrecht [3] in this country, Gardner and Leslie [4] in England and Debre [5] and his coworkers in France.

Since studies of the epidemiology of whooping cough in large centers of population are necessarily confused by the many ramifications of the contacts of individuals, a series of studies of whooping cough outbreaks in strictly rural areas was projected a few years ago by members of the staff of the Cattaraugus County Health Department in coöperation with the Division of Research of the Milbank Memorial Fund. Studies of one such outbreak in the spring of 1931 have been reported upon by Burroughs.[6] Reports of further studies during the fall and winter of 1931–1932 are now in preparation. Cough plate examinations were begun toward the end of the first outbreak and continued throughout the studies. The general plan of procedure in these studies was for a field investigator to make contact with all families in the area selected for study, to gather complete data on all respiratory disturbances appearing among the entire population of the district, and to obtain a complete history of all contacts between the various individuals in this population. For this purpose the investigator made semi-weekly visits to each household and school. On these visits cough plates were obtained from all susceptible children in the schools and also from a selected group of other children and adults comprising about one-third of the residents in the area and chosen to represent a cross-section of the population. As soon as a case of whooping cough was recognized, all the immediate contacts of this case were

* Presented at the mid-year meeting of the New York State Association of Public Health Laboratories, Albany, N. Y., November 4, 1932.

added to the list of persons from whom semi-weekly cough plates were collected.

The plates used in this study were prepared in the laboratory using essentially the original Bordet-Gengou formula [7] with human blood. Due to economic conditions we were able to obtain human blood for a reasonable sum, paying $5 for each single bleeding which yielded from 500 to 800 c.c. of blood. Defibrinated rather than citrated blood was used. All plates were inoculated less than 1 week after being prepared. After inoculation in the field they were sealed with a rubber band and brought into the laboratory the same evening. They were then incubated and examined each day for 5 days. If *H. pertussis* was present small mercury droplet colonies appeared in from 2 to 5 days. The appearance of these colonies was quite characteristic and the speed at which they developed after they first could be seen was remarkable. It was nothing unusual to examine a plate with a hand lens on one day, fail to find any evidence of growth, and yet on the next day find the plate studded with colonies from 1 to 2 mm. in diameter. We encountered some trouble from spreaders but little from the ordinary saprophytes of the respiratory tract which usually grew readily in the first day and thereafter enlarged very slowly. It was our practice to cut out, as soon as they were discovered, any colonies which looked as though they might spread, but frequently we would find a plate completely covered with a spreader.

The chief bacteriological difficulty in confirming the presence of *H. pertussis* lies in the fact that colony and individual morphology may easily be confused with that of the closely related Pfeiffer bacillus, *H. influenzae*. For this differentiation we made use primarily of the established difference of the two organisms in their growth characteristics on chocolate agar and blood agar. Transplants of all suspicious colonies were made to tubes of Bordet-Gengou agar and of chocolate agar.[8] The bacillus of influenza grows readily on chocolate agar within 24 to 48 hours while freshly isolated pertussis organisms fail to grow in 4 days, or the growth is so scanty as to be scarcely visible. On Bordet-Gengou agar the influenza bacillus grows as a flat colony with irregular outlines while pertussis has the characteristic mercury droplet appearance. If the suspected colonies seemed to be *H. pertussis* by these differential media, smears were made from the agar slants, stained and examined to determine if the morphology of individual organisms corresponded with that of *H. pertussis*. In our studies all plates that showed colonies that answered these differential tests were called positive.

A total of 1,996 plates were examined of which 14 per cent were unsatisfactory. Of 343 plates taken from clinical cases in all stages of the disease 22, or 6.4 per cent, were positive. Five additional positive plates were obtained from individuals classed as carriers so that our entire series showed 1.4 per cent positives.

The number of colonies of *H. pertussis* on our positive plates varied from 1 to 100. There was little correlation between the stage of the disease and the number of colonies—single as well as large numbers of colonies (over 50) being obtained from all stages of the disease. We must remember, however, that the inoculation of these plates is a variable technic and that probably the number of colonies more nearly represents the success of obtaining material from the deeper parts of the respiratory tract than it does the actual number of organisms expelled.

Table I lists the plates taken from cases of clinical whooping cough in relation to the stage of the disease. We found one instance in which we ob-

TABLE I

COUGH PLATES FROM PERSONS CLASSED AS CLINICAL CASES OF WHOOPING COUGH

	Time of taking plates	*Plates examined*	*Plates positive*	*Plates negative*	*Plates unsatisfactory*	*Percentage positive*
	More than one week preceding onset	36	0	27	9	0.0
Days of week preceding onset	Seven	1	0	1	0	
	Six	2	0	2	0	
	Five	0	0	0	0	
	Four	3	0	3	0	12.5
	Three	1	0	1	0	
	Two	1	1	0	0	
	One	0	0	0	0	
Days of week following onset	One (date of onset)	3	1	1	1	
	Two	3	2	1	0	
	Three	2	1	0	1	
	Four	4	2	2	0	43.7
	Five	3	1	2	0	
	Six	0	0	0	0	
	Seven	1	0	1	0	
Weeks after onset	Second	23	9	10	4	39.1
	Third	23	4	17	2	17.4
	Fourth	28	1	26	1	3.5
	Fifth	27	0	26	1	0.0
	Sixth	24	0	22	2	0.0
	Seventh	24	0	19	5	0.0
	Eighth	22	0	19	3	0.0
	Ninth	19	0	17	2	0.0
	Thereafter	92	0	79	13	0.0
	Total	343	22	276	45	6.4

tained a positive plate in the week preceding the first catarrhal symptoms of the disease. The highest percentage of positive plates was found in the week beginning with the day of onset. A gradually decreasing percentage occurred during the next 3 weeks. No positive plates were obtained after the 4th week of the disease.

Table II shows the positive plates in relation to the number of individuals furnishing them. We found that semiweekly plates taken through the first 3 weeks of the disease were sufficient to give positive results in 93 per cent of our cases. It is obvious that if plates were taken 4 times a week or daily our chances of raising this figure to 100 per cent would be increased.

These findings are in general agreement with those of other investigators. Chievitz and Meyer [1] in a series of 32 cases obtained 84 per cent positives in the week of onset and 71 per cent in the next 2 weeks, with no positives after that period. Sauer and Hambrecht [3] in a series of 200 cases obtained 98 per cent positives in the week of onset, 65 per cent from the 2nd to the 5th week and no positives thereafter. McGee [9] in a series of 35 cases obtained 56 per cent positives in the week of onset, 63 per cent in the 2nd week, 71 per cent in the 3rd week and 17 per cent in the 5th week. Marie [10] in a series of 48 cases obtained 88 per cent positives in the week of onset, 55 per cent in the 2nd week, 50 per cent in the 3rd week and none thereafter. Gardner and Leslie [4] in a series of 47 cases obtained 75 per cent positives in the week of onset, 67 per cent in the 2nd week, 75 per cent in

TABLE II

CLINICAL CASES FURNISHING PLATES

	Total cases	*Cases with positive plates*	*Percentage positive*
More than one week preceding onset	5	0	
A. Week preceding onset	5	1	20.0
B. Week of onset	10	6	60.0
C. Second week after onset	12	7	58.0
D. Third week after onset	13	4	30.7
E. Fourth week after onset	14	1	7.2
A and B	10	7	70.0
A, B and C	14	13	93.0
A, B, C and D	14	13	93.0
A, B, C, D and E	15	13	87.0

No positive plates were obtained after the 4th week following onset.

the 3rd week and 25 per cent in the 4th week.

All of the cases from which we obtained positive plates would have been diagnosed as whooping cough by clinical manifestations alone. However, in certain cases positive diagnoses could be made by cough plates before clinical symptoms were decisive. Although it requires a minimum period of 7 to 10 days to render a laboratory report on a cough plate, we find that the time elapsing between the first prodromal symptoms and the date on which a positive diagnosis could be made by clinical symptoms alone averaged about 14 days for our series of 16 cases. Actually there were 5 cases in this series on which the laboratory reported a positive plate before the final diagnosis could be made.

We also found positive cough plates from 4 persons who did not develop any symptoms characteristic of whooping cough and who were classed as carriers. These findings have recently been reported in detail by Burroughs and Kline to the American Public Health Association in Washington. The epidemiological evidence of our studies convinced us that these carriers were not responsible for any additional infection and that they are probably of little consequence in the spread of the disease. Post-convalescent carriers were not found.

The possibility of detecting missed or atypical cases by means of cough plates has frequently been asserted in the literature. There were only 2 additional cases in the area studied which could be classified as probable sub-clinical whooping cough, and the laboratory did not obtain plates from either of these individuals before the 2nd week following onset. All plates from them were negative. As in the case of carriers there was no epidemiological evidence that these subclinical cases were in any way responsible for transmitting infection.

On the other hand, there were many persons in the area studied who during the course of our investigations developed some respiratory symptoms, usually suggestive of common colds. We have epidemiological histories of 130 residents of the community not included in the above groups of whooping cough cases or carriers. Although 71 per cent of them showed some respiratory disturbances no positive cough plates were obtained from any of these persons. Many negative cough plates were obtained from them, including 434 plates from 46 persons dur-

ing the course of some respiratory disturbance.

The cough plate method should be of great value in the differential diagnosis between sub-clinical whooping cough and common colds since the early manifestations of whooping cough are clinically catarrhs and coryzas which cannot be differentiated from the symptoms of common colds. If sub-clinical cases were frequent in whooping cough outbreaks, as is commonly stated, we should expect that our series of cough plates from persons residing in whooping cough areas and suffering from respiratory disturbances would serve to identify such cases. The time relationship between the appearance and type of respiratory disturbance and the negative cough plates is shown in Table III. Here we find a large series of plates taken during all stages of respiratory disturbances without a single positive finding. If this is contrasted with the results shown in Table II where we found positive plates from 93 per cent of the cases finally diagnosed as whooping cough, it is apparent that not only does this group of negative findings offer an excellent control of the accuracy of our methods but it also tends to minimize the importance of the rôle played by sub-clinical cases in whooping cough outbreaks.

TABLE III

GENERAL POPULATION COUGH PLATES

No positive cough plates were obtained—All figures represent negative plates

Persons with Respiratory Symptoms	*Week preceding cold*	*During cold*	*Week after cold*	*Totals*
Colds of less than one week duration without cough	10	8	10	28
with cough	2	4	3	9
Colds of one to four weeks' duration without cough	16	47	15	78
with cough	25	79	20	124
Colds of more than four weeks' duration without cough	4	28	1	33
with cough	14	138	10	162
Total number of plates taken during or near colds	71	304	59	434
Number of plates on above persons at other times				311
Persons Who Showed No Respiratory Symptoms				
Number of plates from persons showing no symptoms				75
Total number of plates from the general population				820

DISCUSSION

In considering our experience in connection with the question as to what place the cough plate procedure should be given in the program of a public health laboratory we are at once struck with the uncertainty of the method. Repeated negative cultures have been obtained from patients in the early stages of the disease. On the other hand, the identification of 93 per cent of our cases by the cough plate method has been quite satisfactory. It would seem that the first requirement for diagnosis should be that repeated plates be submitted at frequent intervals early in the disease. We would recommend daily plates. In the next place it is also apparent that errors in the technic of inoculating plates will greatly modify the result. Therefore, it might be well to make the additional requirement that all plates be inoculated in the presence of some person with special knowledge of this procedure. With these two safeguards, the cough plate method may well be included in the program of a

public health laboratory as a means of the diagnosis of whooping cough.

We have shown that the method may serve to detect carriers and it seems quite likely that sub-clinical cases would also have been detected had sufficient plates been submitted at the proper stages of the infection. However, the practical value of detecting either carriers or sub-clinical cases is not established since epidemiological evidence indicates that neither of them are of significance in the spread of the disease.

We know of no application of laboratory findings that would aid in controlling the course of the disease in individuals.

As a means of release from quarantine the findings by cough plate methods seem to be of very little value. Comparison of results with the findings of various investigators using the sputum method of isolating *H. pertussis* show that the latter method is much superior toward the end of the disease, although not so satisfactory in the early stages. Neither method approaches the degree of accuracy necessary in quarantine release technic where dependence must be placed on negative findings.

The most important value of the more general use of cough plates is the research value. There are many disputed questions concerning whooping cough and a large series of cough plates from many laboratories would do much to answer them. For instance, we might be able to rationalize our present quarantine requirements. There are also many important bacteriological questions to be settled. Weill [11] and Debre [12] indicate that the organisms lose their virulence during the course of the disease. The serology of the group is not completely worked out and but little study has been made of dissociation variants.[13] The accessory food factor requirements of other species of Hemophilus have been the subject of some recent investigations, which should be broadened to include the entire group.

Considering all of the above factors it would seem to us that at the present time cough plates are of greater importance to the research than to the routine public health laboratory.

CONCLUSIONS

In times of epidemics of whooping cough the routine public health laboratory can be of considerable service to the physician and to the community in occasionally making a bacteriological diagnosis of whooping cough before a clinical diagnosis can be made. As a means of controlling the spread of the disease, however, this will be of relatively little value since even the earliest cough plate diagnosis will be made after the individual will have passed his period of greatest infectivity. There is at present no evidence that cough plates have any special public health significance in other directions than early diagnosis.

REFERENCES

1. Chievitz, I. and Meyer, Adolph H. Recherches sur la coqueluche. *Ann. de l'Inst. Pasteur*, 30:503–524 (Oct.), 1916.

2. Lawson, George M. and Mueller, Mary. Bacteriology of whooping cough. *J. A. M. A.*, 89:275–279 (July 23), 1927.

3. Sauer, Louis W. and Hambrecht, Leonora. Whooping Cough: Early diagnosis by the cough plate method. *J. A. M. A.*, 95:263–264 (July 26), 1930.

4. Gardner, A. D. and Leslie, P. H. Early diagnosis of whooping-cough by cough-droplet method, with note on vaccines and their use. *Lancet*, 1:9–12 (Jan. 2), 1932.

5. Debre, R., Marie, Julien and Pretet, Henri. Le diagnostic bacteriologique de la colqueluche et la vaccinotherapie anticolqueluche. *Gaz. med. de France*, 2:40–43 (Jan. 15), 1930.

6. Burroughs, Travis P. An epidemiological study of a rural outbreak of whooping cough. *Quart. Bull. Milbank Memorial Fund*, 10:41–52 (Jan.), 1932.

7. Bordet, J. and Gengou, O. Le microbe de la coqueluche. *Ann. de l'Inst. Pasteur*, 20:731–741 (Sept.), 1906.

8. Wadsworth, A. B. *Standard Methods of the Division of Laboratories and Research of the New York State Department of Health*. Williams & Wilkins, 1927, p. 96–108.

9. McGee, W. A. Pertussis. *J. A. M. A.*, 97:922–926 (Sept. 26), 1931.

10. Marie, Julien. Recherches bacteriologiques et immunologiques sur la coqueluche, Paris, thesis for doctorate, 1928.
11. Weill, E. Etiologie et prophylaxie de la coqueluche. *Medicine*, 2:841–842 (Aug.), 1921.
12. Debre, R., Marie, Julien and Pretet, Henri. Le diagnostic bacteriologique de la coqueluche sa facilite et son interet. *Presse med.*, 37:18–20 (Jan. 5), 1929.
13. Leslie, P. H. and Gardner, A. D. Phases of Hemophilus pertussis. *J. Hyg.*, 31:423–434 (July), 1931.

STANDARDIZATION OF THE COMPLEMENT-FIXATION TEST FOR SYPHILIS*

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PERSONAL preference for particular details in the complement-fixation test for syphilis renders improbable the general adoption, at this time, of any one technic *in toto*. If agreement on basic principles can be secured, however, a nucleus for a standard method will be provided. Coöperative studies made prior to 1930 indicated that, even with manifold variations in details, the complement-fixation tests for syphilis extensively used in Canada and the United States had much in common; also, that the least satisfactory of them, although generally lacking in sensitivity, seldom gave definite reactions with specimens from persons believed to be free from syphilis. Consequently, the conclusion seems warranted that, if precautions are observed to prevent technical and clerical errors, the chief concern in standardization will be the incorporation of factors found essential for obtaining significant results with weakly reacting sera.

Experience has shown that the outline for a standard procedure proposed in 1924, when the problem of standardization was first undertaken, meets such a requirement in most particulars. In 1930, this outline was modified to incorporate features of technic believed to be desirable for insuring further the delicacy of the test, and was then submitted to representative serologists, the majority of whom signified hearty accord with the general plan for a standard procedure. The Committee on Standard Methods of the Laboratory Section of the American Public Health Association, at the meeting held in Washington, October 24, 1932, approved the technic recommended as a standard method, and referred the report to the section for final action next year.

Provided the test is performed by a capable personnel and is suitably controlled, and precautions to avoid technical inaccuracies are observed, the outstanding features of the procedure offered as a standard may be summarized as follows: the distribution of standard reagents by central laboratories; the employment of a cholesterolized antigen having a high degree of selectivity with serum from cases of syphilis; the performance of an independent complement-fixation test with a second antigen or of another generally accepted serological test for syphilis (precipitation or flocculation), for

* Abstract of the report of the Referee on the Standardization of the Complement-Fixation Test for Syphilis presented to the Committee on Standard Methods of the Laboratory Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932. The complete report will be published in the American Journal of Syphilis.

purposes of control; the use of amboceptor that is markedly hemolytic and practically free from agglutinative properties in the dilutions used; complement that has been proved by preliminary tests to be actively hemolytic and to be readily fixed in the presence of antigen and syphilitic serum and which fails to react appreciably with antigen alone; a comparatively large amount of patient's serum as well as a smaller quantity to detect so-called prezone reactions; and an extended preliminary period for fixation at a low temperature with an additional exposure for a few minutes at 37° C., or provision for a second test with fixation at 37° C. for from ½ to 1 hour, in case the history indicates the possibility of recent infection.

VITAL STATISTICS

The Census of 1930 and the Growth of Population in Finland During the Last Decade—Some preliminary data concerning the results of the general census of 1930 in Finland are now available. The total registered population of Finland amounted to 3,667,067 persons on December 31, 1930. During the last half century, the population has increased from 2,060,782 in 1880, to the 1930 figure of 3,667,067. The decennial increases during this period have varied considerably. Between 1880 and 1890, the total increase was 319,358, or 15.5 per cent; between 1890 and 1900, 332,422 or 14.0; from 1900 to 1910, the increase amounted to 402,635 persons, or 14.8 per cent; between 1911 and 1920, to 249,610, or 8.0 per cent; and between 1920 and 1930, the increase was 302,260, or 8.2 per cent.

During the decade 1921–1930 the increase in population was slightly higher than during the preceding period of 10 years. In comparison with 1901–1910, however, the increase in population has fallen off very much. When it is considered that the civil war and severe epidemics occurred during 1911–1920, which greatly retarded the growth of the population, the increase in population of the latest period appears very small, for during the years 1921–1930 the conditions were in every respect normal. The mortality was very favorable. The poor growth of population was consequently due entirely to the great falling off in births.

Although the growth of population in Finland during the last 10 years proceeded more slowly than during earlier normal periods it is nevertheless quite large in comparison with conditions in the other countries of Western and Northern Europe. During 1921–1930, the growth of the population for Hungary amounted to 9.0 per cent; for Denmark 8.7 per cent; Belgium 8.2 per cent; France 6.9 per cent; Norway 6.2 per cent; England and Wales 5.3 per cent; Switzerland 5.0 per cent; and Sweden 4.0 per cent.

These figures of population growth are the results of greatly varied conditions of population. Together with Hungary, Finland has the highest rate of natality of these countries, but the surplus of population, for instance in Denmark, is approximately as large in spite of the lower birth rate in this country, because the conditions of mortality in Denmark are more favorable than in Hungary and Finland. In France, immigration from other countries has also contributed toward the increase in population.

Of the total population in Finland in

1930, 1,809,069 were males and 1,857,998 females. The excess of females was 48,929 and there were 1,027 females per 1,000 males. The disproportion between the number of men and women in countries which engaged in the Great War, does not apply to Finland, despite the fact that the latter incurred considerable losses to its male population during the civil war. These losses are not comparable to those suffered by the Great War contestants. As compared with Finland's ratio of 1,027 females per 1,000 males, England showed 1,096, Germany 1,066, and France 1,103 females per 1,000 males.

The rural population still predominates in Finland, although the population of towns regularly grows at a more rapid pace than the population in the country. In 1930 altogether 671,845 persons, or 18.3 per cent, dwelt in the towns and 2,995,222, or 81.7 per cent, in the country. During 1921–1930 the urban population grew by 128,799 persons, or almost one-fourth, and the rural population by 173,461 persons, or only one-sixteenth. The population of the so-called urban districts (boroughs or country-towns) is included in the rural population, though it is really more closely allied to the towns than to the country. Besides there are a number of densely populated districts especially in industrial centers and suburban areas in the vicinity of towns that have townlike settlements. If these are classified in the same category as the towns, the proportion of the population living in towns in 1930 would be 22.1 per cent instead of 18.3 per cent, and the proportion living in actual rural areas 77.9 per cent instead of 81.7 per cent.

The increase in the urban population has in the course of time become more and more dependent on immigration from the countryside. Although the urban population increased almost fourfold during the 50-year period 1880–1930 the excess of births over deaths, after rising up to 1910, fell off again in absolute figures. During the 10 years 1921–1930 it was about as small as for 1881–1890. Calculated per 1,000 of the average population of the towns, this represents an enormous reduction; from 7.9 per 1,000 in the 1880's to 2.8 per 1,000 for 1921–1930. At the same time the excess of births over deaths in the rural districts dropped from 14.5 to 9.2 per 1,000, also a considerable falling off. The proportion per 1,000 in the rural districts was, nevertheless, during the last decade still more than three times the corresponding figure for the towns.

This reduction in the excess of births was chiefly due to the fall in the birth rate, which was especially marked in the towns. During 1881–1890 the birth rate in the towns averaged 29.2 per 1,000 of the population, whereas in 1921–1930 it was only half that figure of 15.0 per 1,000. With regard to the rural population the corresponding development was as follows: the birth rate was 35.6 per 1,000 in 1881–1890 and 23.6 for the last decade. The reduction is consequently approximately one-third in this case.

During this half-century the death rate also fell off, although to a far smaller extent than the birth rate.

While the difference in the figures of births in the towns during 1881–1890 and 1921–1930 was 14.2 per 1,000, the corresponding difference in deaths was 9.1 per 1,000. In the rural districts the development in this respect proceeded rather more slowly. The difference between the figures for births for these two decades was 12.0 per 1,000, while the figures for deaths recorded a difference of 6.7 per 1,000.—G. Modeen, M.A. Census of 1930 and the Growth of Population in Finland During the Last Decade. Bank of Finland. *Month. Bull.* 11:22–25 (Nov.), 1932.

Statistics on Tuberculosis—The 1930 report of the director of the Amsterdam association for the combating of tuberculosis indicates that the regular decline of mortality from tuberculosis in Amsterdam and in the Netherlands as a whole has been continued. The mortality rate of tuberculosis in Amsterdam is lower for men than for women. There have been no changes in the organization of the consultation centers of the district. A characteristic feature of this organization is the coöperation between the association, the physicians, the public health service, and the ministry of labor. As for methods employed, the attempt to search out all patients having open pulmonary tuberculosis has come to the fore. The number of children treated with BCG vaccine increased in 1930, and no harmful effects were observed. The general impression with regard to its value is favorable. The results of the Pirquet reaction on 22,694 children, aged 0–14, for the years 1920–1930 and the year 1930, show that the percentage of positive reactions is diminishing every year.

With reference to urban and rural tuberculosis, Dr. Josephus Jitta has published some interesting figures. The mortality rate in 1930 was only 7.31 per 10,000 inhabitants. During the period 1921–1930, the decline in tuberculosis mortality was 50 per cent for the cities and 33 per cent for the rural districts. The mortality from tuberculosis has increased considerably in children under 1 year of age.—*J.A.M.A.* 100:985 (Mar. 25), 1933.

Industrial States Decline Most in Births—In so far as it has been possible to judge from the partial data available, the decline in the birth rate during the last 10 years has been practically countrywide. Unfortunately, data for only 26 of the 48 states, and for the District of Columbia, are obtainable for both 1931 (the latest year for which the facts have been published) and for 1921; but, without exception, the birth rate has dropped in these 27 areas.

There has been, however, a wide divergence in the rate of decline. The 3 Pacific Coast states, Oregon, with a birth rate of 13.6, California 13.9, and Washington 13.9 had the lowest birth rates in 1931; and Oregon and Washington at the same time rank among the 10 which show the greatest declines in the 10-year period. California just escapes inclusion in this group.

It is most interesting and significant that the greatest declines in the birth rate have occurred in the states of the northeastern section of the country where the population is highly industrialized. Connecticut's birth rate of 15.7 in 1931 shows the very largest drop—one of 34.9 per cent; this being closely followed by the decline of 34.5 per cent in New Jersey which shows a birth rate of 15.6 in 1931. These 2 states stand out in rather bold relief from all the rest; for there is a sizable gap between them and still another industrial state—Massachusetts, with a birth rate of 16.1 in 1931, showing the third largest decrease (one of 31.8 per cent). Rhode Island, with a birth rate of 16.3, had the fifth largest decline; Pennsylvania, with a birth rate of 18.4, had the ninth; and the drop in New York State, with a birth rate of 16.1, was well above the average for these 27 states. Even North Carolina, recording a natality rate of 23.0 and suffering the fourth largest decline, showed a considerable increase in the industrial population during the 10-year period. It seems hardly possible, however, that this alone is sufficient to account for so large a decline as the one of 31.1 per cent observed in North Carolina's birth rate.

In the few Southern and "Border" states included among those for which

there are data for 1921 and 1931, the situation is widely divergent. North Carolina suffered a large decline; so did Virginia with a drop of 29.5 per cent and Maryland with one of 30.0 per cent. In Mississippi on the other hand, the drop was only 11.9 per cent and in the District of Columbia, which is really a city rather than a state, the smallest decline of all (5.9 per cent) was registered.

Among states with largely agricultural populations, Oregon, Washington, New Hampshire, and Virginia were those to suffer above-average drops in the birth rate. Main and Mississippi, on the other hand, suffered the smallest declines; and Wisconsin, Minnesota, Vermont, Nebraska, and Kentucky recorded below-average decreases.

Pronounced differences appear in certain states which adjoin one another and which call for special study. For example, the drop in New Hampshire has been more than twice that in Maine and 50 per cent more than in Vermont. All 3 are states with large rural populations and negligible negro populations. The drop in South Carolina is much less than that in North Carolina, and the decline in Kentucky about one-fourth less than that in Virginia.

New Mexico and Nevada, the states which recorded the highest and the lowest birth rates in the country in 1931, were admitted to the U. S. Birth Registration Area since 1921; and it is thus impossible to determine the extent to which their natality rates have dropped during this 10-year period. New Mexico's 1931 birth rate was 28.4 per 1,000 population and Nevada's 13.2. Both were admitted in 1929, and there was actually a slight increase in the birth rate in New Mexico during the short period of 3 years for which the facts are obtainable. This may well reflect the improvement in birth registration in recent years. In Nevada, the drop has been small. In Arizona, admitted in 1926, there has been no general downward trend in the birth rate, although a sharp drop was recorded in the year 1931. Arizona, like New Mexico, has a large Mexican population; and it is extremely probable that the Mexicans constitute the one racial element of the population which is not sharing in the declining birth rate. In several of the states, admitted to the birth registration area since 1921, the birth rate showed either a slight upward trend, or no appreciable change until the year 1931. The most conspicuous examples of this are Arkansas (admitted in 1927), Georgia (1928), Idaho (1926), North Dakota (1924), Oklahoma (1928), and Tennessee (1927).

Georgia has the distinction of being the only state to show a higher birth rate in 1931 than in 1930. In Oklahoma (17.7) and Wyoming (19.8), the figures were identical for the 2 years.—Met. Life Ins. Co. *Stat. Bull.* 14:3–5 (Mar.), 1933.

Vital Statistics for Pennsylvania in 1932—The provisional total of live births registered in Pennsylvania in 1932 was 168,202. This number represents a birth rate of 17.1 per 1,000 population which is the lowest ever experienced in the Commonwealth. With the exception of 1929–1930 there has been an annual decrease since 1927 of approximately 10,000 in the number of live births recorded in this state.

Mortality as well as natality was unusually low in 1932. The preliminary general death rate of 10.9 per 1,000 population and the total of 107,595 deaths, exclusive of stillbirths, were lower than any other year's record. When final tabulations for the year are completed, this total and rate will be increased somewhat. And it is likely that the final mortality total for last year will be less than the record low of 1921 when only 109,919 deaths were

reported. Consequently, it is very reasonable to predict that the 1932 general death rate will establish a new minimum.

Compared with preceding years, infant mortality in 1932 was favorable. For the first time in Pennsylvania's history, deaths under 1 year of age numbered less than 10,000. While the totals of 9,919 infant deaths and the rate of 59 per 1,000 live births were provisional, they indicate a final infant mortality figure that is considerably less than average. The death rate from diseases of early infancy of 23.6 per 1,000 live births was somewhat higher than the corresponding rate in 1931 and lower than the 1930 figure.

In four diseases of childhood, namely, infantile paralysis, diphtheria, scarlet fever and whooping cough, the deaths showed increases over 1931. The mortality from poliomyelitis (infantile paralysis) in 1932 was greater than in any year since 1916 when 668 deaths occurred and a case fatality rate of 31 per 100 cases was registered. Last year there were 13 deaths from this disease per 100 reported cases. In spite of a substantial reduction in its morbidity, the diphtheria mortality increased in 1932. However, while this rate of 4.0 per 100,000 population was higher than that of 1931, it was lower than the diphtheria mortality of any other year.

Judging from preliminary reports, the mortality from tuberculosis and pneumonia in 1932 was lower than in former years. The 1932 death rate from tuberculosis (all forms) was 52.5 per 100,000, as compared with 56.5 in 1931; for pneumonia the 1932 rate was 81.5 and the 1931 rate 97.2. On the other hand, the deaths and death rates from heart disease, cancer, cerebral hemorrhage and diabetes continued to rise, the mortality from these diseases in 1932 being reported as follows: heart disease 238.4; cancer 102.1; cerebral hemorrhage 85.7; and diabetes 25.7. Due to the widespread incidence of influenza in the latter part of the year, there was an increase in the death rate from this disease, from 28.1 in 1931 to 29.3 in 1932. A slight rise was noted in the suicide rate from 4.5 per 100,000 in 1931 to 4.6 in 1932; at the same time there was a slight decrease in the homicide rate from 4.0 in 1931 to 3.9 in 1932. Accident fatalities in general registered decreases from preceding annual reports. This is explained partly by more unemployment and less use of motor vehicles due to current economic conditions.—Pennsylvania Dept. of Health. *Vital Stat. Bull.* 8:6 (Mar.), 1933.

PUBLIC HEALTH ENGINEERING

Protecting Bathing Facilities by Use of an Ammo-Chlorine Boat—The attempt to control the contamination of five bathing areas of the "impounded stream" type and four of the "artificial lake" type scattered over an area of about 200 square miles in the Forest Preserve District of Cook County, Ill., is described.

A portable type of chlorine boat mounted on a two-wheeled automobile trailer was designed. In addition to a chlorinator and ammoniator of the dry feed type, the boat was fitted with racks for carrying at least a thousand pounds of liquid chlorine or ammonia. As great accuracy was not considered essential a control apparatus of the pulsating meter type was used. The motive power was provided by a medium sized outboard motor which also assisted in diffusion of the chlorine.

As local conditions differed in each bathing area an effort was made to adapt the treatment to the particular location. The results are discussed from the standpoint of one location of the "impounded stream" type. The author concludes that it is possible at least temporarily to control the bacterial content of certain natural or semi-natural swimming locations. Chauncey A. Hyatt, *Munic. San.*, III, 9, 370–371 (Sept.), 1932. From *Pub. Health Eng. Abstr.*, XIII (Jan. 7), 1933. Abstr. H. N. Old.

Conformity of Public Water Supplies to the U. S. Treasury Department Standards—The author briefly reviews the evolution of the present Treasury Department Standards for drinking water used on interstate carriers and the procedure followed in the certification of the same. In 1931, 1944 public water supplies in the United States were used as sources of drinking and culinary water by interstate carriers. Seventy-nine per cent of the supplies reported on were recommended for favorable certification, 18.5 per cent for provisional certification and 2.5 per cent prohibited for use. Practically all favorably certified supplies meet the bacteriological standards as did 78 per cent of those provisionally certified. Probably 75 per cent of all public water supplies would meet Treasury Standards as a whole and about 90 per cent would meet the bacteriological standards. R. E. Tarbett, *J. Am. W. W. Assn.*, 24, 9:1281–1287, 1932. From *Pub. Health Eng. Abstr.*, XIII (Jan. 7), 1933. Abstr. H. K. Gidley.

Colon-Aerogenes Types of Bacteria as Criteria of Fecal Pollution—As the result of extensive work of their own and the examination of published articles and reports which they briefly review, the authors conclude: "(1) There is a growing sentiment that the Bact. aerogenes types of organisms in water, apart from Bact. coli, have little significance as criteria of fecal pollution; (2) the fecal significance of organisms designated as Bact. coli and Bact. aerogenes depends on the differential method used to distinguish them; (3) in ferrocyanide citrate agar, the Bact. coli type of colony is the only one strictly characteristic of feces; (4) the Bact. aerogenes type and the intermediate types as determined by this medium, are inconsequential in feces; (5) the distinctive types of colon-aerogenes organisms in ferrocyanide citrate agar retain their definite colony characteristics for at least six

months—as determined by subsequent plating of a large number of strains in the same medium; (6) it is the author's conclusion that the Bact. coli type of colony in this medium is alone definitely indicative of fecal pollution; that the Bact. aerogenes type and the intermediate types of colonies are of no special fecal significance, and that the latter types should, therefore, be excluded from consideration as evidence of dangerous fecal pollution. F. O. Tonney and R. E. Noble, *J. Am. W. W. Assn.*, 24, 9:1267–1280 (Sept.), 1932. From *Pub. Health Eng. Abstr.*, XIII (Jan. 14), 1933. Abstr. H. K. Gidley.

The Use of Bleaching Clay in Water Purification—"Bleaching clay shows advantage in water treatment by reason of its low price and its great capacity to remove tastes, odors and color. These complex silicates are very inert to reactive chemicals, so that there are not the possibilities of unwanted chemical reactions as there is with superchlorination and with ammonia. Bleaching clay removes unpleasant characteristics from water by removing the substances causing them. Its use does not impart any chemical characteristics to the water that might be disagreeable. To remove unwanted material from water by a natural, untreated substance, as a clay, does not produce any unpleasant psychological reaction in the mind of the consumer. Bleaching clay has the capacity to remove traces of phenol from phenol contaminated water; shows considerable capacity to remove chlorine and sulphuric acid from water containing these chemicals; with aluminum sulphate forms a heavy floc which settles rapidly.

"Bleaching clay itself has bactericidal properties. With prechlorination, the great capacity of the clay to take up chlorine brings about more effective sterilization and reduces putrefaction and bacterial proliferation in basins and filters to a minimum. The economies possible in lessening the amounts of lime and other chemicals needed reduce the cost of using bleaching clay. Seven to ten cents a million gallons, for a few pounds of bleaching clay used regularly, even when there are no serious color or odor problems, will be well spent as insurance against variability and possible trouble. The more unwanted substances are removed from the water supply, the less chance dissatisfaction will arise." Edw. M. Slocum, *Journal Pennsylvania Water Works Operators' Assn.*, IV, 53–64, 1932. From *Pub. Health Eng. Abstr.*, XIII (Jan. 14), 1933. Abstr. Judson A. Harmon.

Why a Seasonal Quarantine Is Placed Upon Mussels and Clams—Since 1927, when an outbreak of mussel poisoning involving over 100 cases occurred in and around San Francisco, the California State Board of Health has established a quarantine on shellfish during that season of the year when the poison is at a maximum in the mussels and clams. The toxicity of the shellfish varies from season to season and from month to month, increasing during the summer months, and it may reach a maximum as early as June or as late as September. It has been found that ¼ ounce of bicarbonate of soda added during cooking, for each quart of water used, destroys 85 per cent of the poison when the cooking process is continued for 20 to 30 minutes.

Occurrence of the poison in clams does not run strictly parallel to its occurrence in mussels. In both cases the poison is confined almost entirely to the intestines of the bivalve and since these organs are larger in clams they are generally discarded, hence clam poisoning is not as frequent as mussel poisoning. It is to be remembered that cooking alone, without the

use of bicarbonate of soda, does not reduce the danger of poisoning. By general use of the bicarbonate of soda and by laboratory tests on the strength of the poison, it may be possible in the future to reduce the time of quarantine to a minimum. H. Muller, *Weekly Bull.* Calif. State Dept. of Pub. Health, XI, 35:138–140 (Oct. 1), 1932. From *Pub. Health Eng. Abstr.*, Vol. XIII, Jan. 21, 1933. Abstr. Frank E. DeMartini.

New Paris—A very serious view is taken of the inadequate supply of potable water and means of sewage treatment for the rapidly growing population of Paris. At present about 3 mil. c.m. of water is provided, 1,815,000 c.m. of which is purified Seine and Marne water. It has been estimated that by 1960 a further 2 mil. c.m. will be required, which for navigation reasons cannot be withdrawn from the river. In 10 years the quantity of water used for condensation purposes in big electrical power stations will have risen to 120 c.m. per sec. from 12 c.m. per sec. A corresponding increase in the temperature of river water will give rise to fogs in the valley. Ninety-two mil. c.m. of sewage is discharged untreated into the Seine; consequently river water must be treated with high chlorine dosages. It is urged that increased treatment of sewage on land, and the construction of impounding reservoirs for potable water should be immediately undertaken if a crisis in 10 years' time is to be averted. F. Bordas and J. Riviere, *Rev. d'Hyg.*, 8, 38, 1930. From *Summary of Current Lit.*, Water Pollution Res., VI, 3:77 (Mar.), 1933.

The Water Supply and Sanitation of Paris and District—The writer, in a critique of "New Paris" by Bordas, F., and Riviere, J. (see previous Abst.) considers that the situation in the water supply and sanitation of greater Paris is not as grave as they assume. He ascribes the defects of the water supply system to an out-of-date administrative organization. The water supply of Paris itself is sufficient and more for present day needs, but a 5 per cent increase per annum in the potable water demand is foreseen in the next 20 or 30 years. The suburbs generally have an insufficient water supply, *e.g.* in the Seine Department only 150 litres per head of potable water is provided, while in Paris there are 500 litres per head. A greater coöperation between Paris and its suburbs and the lessening of the number of separate water works is urged. New sources of potable water for greater Paris are under consideration and will probably be provided by ground water from the Loire valley. The program of the Ministry of Public Works to erect a system of dams in the upper Seine basin which will regulate the water level at the mouth of the river for navigation purposes, and have an accessory value in controlling flood levels, producing electrical energy, and providing a supplementary supply of water for Paris is described. In discussing the sewerage of Paris the writer describes briefly the program put forward in 1929 by the Conseil-general of the Seine which includes the construction of a chain of collecting sewers encircling Paris to the north and south and avoiding discharge of sewage into the Seine or Marne during their flow through the city. An artificial treatment plant capable of enlargement according to future needs is also to be erected to prevent pollution of the Seine, and the present irrigation fields are to be maintained. The difficulties involved by this scheme, including coöperation between the neighboring departments, are discussed. The author shows that the raising of the temperature of the river by the condensation waters from the power sta-

tions is not at present a serious problem; should it become so in the future the improved sanitation conditions will counteract its effect. H. Giraud, *Ann. d'Hyg.*, 9, 293, 1931. From *Summary of Current Lit.*, Water Poll. Res., VI, 3:77–78 (Mar.), 1933.

Cotton Guard Rope in Swimming Pools as Source of Colon-Aerogenes Group—Positive presumptive tests which gave typical aerogenes colonies on partial confirmation were given by water from a swimming pool after the introduction of a cotton guard rope which was immersed in the water. Examination of strands from the rope showed the presence of the colon-aerogenes group and it was found that bacterial growth was possible upon the moist rope Guard ropes of organic material are unsuitable for use in swimming pools. H. W. Leahy, *J. Am. W. W. Assn.*, 24, 1062, 1932. From *Summary of Current Lit.*, Water Poll. Res., VI, 3:87 (Mar.), 1933.

A New Nutrient Medium for the Isolation of B. Coli—A new medium for the detection and isolation of B. coli utilizes the characteristic growth of B. coli on agar containing traces of copper. Two drops of 10 per cent copper sulphate solution are added to 10 c.c. alkaline liquid agar; the mixture is autoclaved at 110° C. for 20 mins. and then poured into petri dishes and left to set. Colonies of B. coli develop rapidly. Each has a fine rim and is raised at the center; a central yellowish brown zone is surrounded by a yellow and then a light yellow zone. All of these, especially the middle zone, show a copper lustre. The usual cultural and fermenting properties of the colonies are maintained. Selectivity is exhibited by the medium; typhoid, paratyphoid, Gartner, and dysentery, diphtheria bacilli, fecalis alkaligenes and lactis aerogenes bacteria and staphylococci do develop in it after 24 hours incubation at 37° C. Very rarely whitish, not transparent colonies of B. paratyphosus B. may appear. The imperfect development of the typhoid bacilli may be used as a criterion for their identification. G. Cascelli, *Zbl. für Bakt.*, I, Orig., 124, 537, 1932. *Summary of Current Lit.*, Water Poll. Res., VI, 3:94 (Mar.), 1933.

INDUSTRIAL HYGIENE

Lead Poisoning, New York State, 1931—There is given a table of 85 cases of lead poisoning reported during 1931—27 cases among general painters, 24 among storage battery workers, 6 among color manufacturers, 5 among printers, and the balance scattered. A conspicuous reduction was noted in lead poisoning in the storage battery industry, largely due to the efforts of one large plant to control it.—Adelaide Ross Smith. *Indust. Bull.*, New York Dept. of Labor, 11, 10:315 (July), 1932. E. R. H.

Silicosis—The Hazard, What It Is, and How It May Be Prevented—This is a summary of the present-day problem of silicosis, particularly as related to New York State and should be read in the original by those further interested. Two or three important features stand out in the prevention. such as physical examinations and the control of silica dust in the breathing atmosphere.—J. D. Hackett, *Indust. Bull.*, New York Dept. of Labor, 11, 15:475–476 (Dec.), 1932. E. R. H.

Silicosis in Great Britain—The Secretary for Mines was asked by Mr. David Grenfell the number of cases of silicosis reported from each of the British coalfields, to which he replied that silicosis was not a notifiable disease and the only figures were those of cases paid compensation. The number of such cases between February 1, 1929, and December 31, 1931, was 91, including 20 fatal cases. The number of cases in 1931 in which compensation was paid was 52, of which 13 were fatal.

The Coal Mines Act requires the prevention of dust from power drills when they are used for drilling in ganister, hard sandstone, or other highly siliceous rock.

The stone dusting of colliery roadways as a protection against coal dust explosions has been generally enforced for nearly 12 years and has proved remarkably effective. The Secretary knew of no evidence that the practice had been injurious to health. The evidence in the very few cases (of silicosis), which were not definitely associated with the use of power drills in siliceous rock, was not conclusive. The condition of the lungs known as Anthracosis was not specifically related to the use of power drills.—Parliamentary Debate, House of Commons, Nov. 15, 1932, *Indust. & Labour Inf.*, Dec. 12, 1932, p. 330. E. R. H.

Occupational Disease, New York State, 1932—Typed tables show the prevalence and nature of occupational diseases reported, divided into those "up-state" and those for New York City—the latter further subdivided into those which were allowed compensation and those which were disallowed.

The grand total for the year 1932 was 610, of which 458 appeared on the compensation schedule and 152 were unclassified. The largest single group was benzol, etc., with 107 cases, followed by dermatitis due to alkalies, 102 cases; lead poisoning, 79 cases; and dermatitis due to oils, 61 cases; while afflictions due to lacquers, solvents, carbon monoxide, petroleum products, and chrome were all fairly frequent.

A more extensive table compares the years 1930, 1931, and 1932, and arranges the causes in alphabetical order

—the occupational diseases reported being due to about 140 causes. The totals for the 3 years were 864, 568, and 615 respectively. The prominent causes, in addition to those mentioned above, were: Acids, anilin dyes, amido-derivatives of benzine, anthrax, arsenic, benzine, calcium hydroxide, cement, various forms of dermatitis, dyes, dusts, mercury, poison ivy, silica, soap and soap powders, sodium hydroxide and turpentine.—Division of Industrial Hygiene, New York State Dept. of Labor (received March, 1933).

E. R. H.

The Position of the Medical Officer of Health in Relation to Industrial Hygiene—After reviewing the historical fact that industrial hygiene in the British Isles has been administered from a central source—in more recent years by the Home Office—the author discusses the experiences in the city of Coventry following a voluntary liaisson set-up between the Engineering Employers' Association and the Local Board of Health of which the author is Medical Officer. Thus the Local Board fills an advisory rôle in relation to factory welfare and occupational hygiene in a vicinity employing some 50,000 persons, and factory hygiene is not omitted from the local public health scheme.

In the discussion which followed, Dr. Clyde McKenzie (Smethwick) opposed the control of factory inspection by the local authority for several reasons: The loss of time in a factory was almost entirely dependent on the general health of the workers rather than on occupational risk (in which situation the local medical officer of health already had ample powers), and a small centralized staff was necessary to build up the special knowledge necessary to understand and control occupational diseases. Local interest was acceptable from the voluntary standpoint, but any legislative control should be from a central office to insure uniform standards.—A. Massey, *J. Roy. San. Inst.*, 53, 9:494–499 (Mar.), 1933.

E. R. H.

Frequency of Pneumonia Among Iron and Steel Workers—This *Bulletin*, after describing the statement of the problem, takes up the factors apart from working conditions such as seasonal influences, economic status, age, race, alcoholism, and community pneumonia, followed by a study of the incidence of pneumonia in relation to the nature of iron and steel working conditions.

Previous studies of industrial sick benefit associations by the Public Health Service have consistently shown a higher rate of pneumonia among these employees than those in other industries as a whole. The present study, 1924–1928, showed 35 per cent increased incidence of pneumonia above the average for all reporting establishments in the steel industry. The highest rates were among employees of the blast furnace, coke plant, open hearth, general labor about the mills, and rod and iron mills. The departments showing a high pneumonia rate tended also to show abnormally higher rates of influenza and other diseases of respiration.

Factors apart from working conditions were of insufficient influence to account for the excesses described. The frequency of pneumonia among men exposed to inclement weather was 13.6 cases annually per 1,000. The rate among men subjected to heat hazards involving wide temperature changes was 12.6 per 1,000. That among 1,000 factory men exposed to no industrial condition was only 3.9 per 1,000. Strenuous work also appeared to intensify the hazard when performed under intermittent exposures to high temperatures. There appeared to be no way

of evaluating the effect of dust upon the incidence rate of pneumonia. Likewise, the influence of gases alone could not be measured, although the only gas found in sufficient concentration to produce physiological changes was sulphur dioxide. A common factor appeared to be, sudden cooling or chilling of the body.

Of those who died of pneumonia, nearly one-fifth succumbed before the end of the first week of illness, while among those who recovered, 50 per cent were disabled for 6 weeks or more. These tended to show a higher rate of heart effects than found in a control group in the same plant or among industrial workers in general. A number of recommendations complete the report.—Dean K. Brundage *et al., Bull. 202*, U. S. P. H. S., Nov., 1932, 51 pp. E. R. H.

Annual Report, Institute for Science of Labour, 1930-1931 (Japan)—This report of 25 pages embodies the findings of a group of research workers and investigators devoting their time to various subjects in occupational hygiene and diseases.

The organization of the Institute is described and the first 10 years of its progress completed July, 1931. The report gives a list of the lectures and reports made by the members of the staff at various meetings and congresses as well as abstracts of the papers published by the staff for the fiscal year ending July 30, 1931. Most of these papers (34 in number) have appeared in the *Journal of the Science of Labour*, but a number of them are cited in the *Japanese Yearbook of Social Science* and some in the Commemoration Number of the 10th Anniversary of the Institute. It also has been decided to select and translate some of the papers into English and German, and a list of a dozen of these is advertised. The report also contains a diagram of the ground plan of the Institute and a list of the staff of some 30 persons.—Gito Teruoka, Director, Institute for Science of Labour, Kurasiki, Japan (received October, 1932). E. R. H.

Occupational Diseases in Czechoslovakia—Cases of occupational diseases notified to the Accident Insurance Institutes at Prague and Brno between July 1, 1932, and November 30, 1932, were as follows: Prague, 595; Brno, 302. Most of these were cases of silicosis; cataract, lead poisoning and cancer come next on the list. The Czechoslovak Act relating to compensation for occupational diseases came into effect July 1, 1932.—*Indust. & Labour Inf.*, XLV, 11:322 (Mar. 13), 1933. E. R. H.

Sickness Among Male Industrial Employees During the Final Quarter of 1932—The influenza epidemic during the fourth quarter of 1932 caused a higher rate of sickness among employees in the selected industries studied, but if this cause is deducted the frequency of sickness is just about the same as in the corresponding quarters of 1930 and 1931.—Dean K. Brundage, *Pub. Health Rep.*, 48, 13:322 (Mar. 31), 1933. E. R. H.

Pottery—The report includes a descriptive introduction, the extent and scope of the pottery industry in the United States and the conditions found in three typical plants, after which the process of manufacture and the potential health hazards are given. These latter are discussed under the heads of dust, heat, lead poisoning, chemicals, dampness, other hazards, and "frequency and severity rates." In addition, there is a Classification and Index of Jobs with the chief hazards given for each.—Retail Credit Company (Atlanta, Ga.), *Industry Report*, 8, 4:33–42 (Apr.), 1933. E. R. H.

FOOD AND NUTRITION

Vitamin D and the Conservation of Calcium in the Adult. *II. The Effect of Vitamin D on Calcium Conservation in Adult Rats Maintained on Low Calcium Diets*—In a previous paper (*J. Biol. Chem.* 97:265, 1932), results were reported on feeding a high calcium-low phosphorus rachitogenic ration with and without additional vitamin D.

In the present paper are reported results obtained on adult rats kept on a ration low in calcium and phosphorus with and without vitamin D supplements.

Three rations were used in these experiments, one consisting of yellow corn, wheat gluten and sodium chloride, and containing 0.058 per cent calcium and 0.28 per cent phosphorus.

The second was a duplication of the first ration except that vitamin D had been synthesized therein by exposure to ultra-violet radiations.

The third which served as a normal control ration, was composed of two-third stock Ration 14 (*Science*, 57, 449, 1923) and one-third whole milk powder. It contained 0.56 per cent calcium and 0.58 per cent phosphorus. Four groups of female rats were used. One group was killed at the beginning of the experiment and the other three received the rations.

The general appearance and behavior of the rats showed no significant variation from the normal until the 10th week, at which time they became so restless it was necessary to transfer them to individual cages. By the end of the 15th week the differences in the three groups were very pronounced. On the non-irradiated low calcium ration diet there was a hypertonic condition of the muscles and the animals were emaciated and senile in appearance. The rats on the irradiated low calcium diet did not become so emaciated and there was no muscular tenseness.

The femurs suffered a 10 per cent reduction in ash. The introduction of small amounts of vitamin D into the calcium-deficient ration provided considerable protection from mineral losses in a parallel series of the rats. Only about 6.5 per cent of ash was lost from the femurs. Weight losses were greatly reduced. Calcium content of the blood serum was increased and the parathyroids were maintained almost normal in size.

III. The Effect of Vitamin D on the Teeth of Rats—These experiments were carried out in two series. For the lactation series the stock diet consisted of yellow corn, oil meal, crude casein, alfalfa, bone ash, sodium chloride, dried yeast, skim milk powder, and butter fat. Vitamin D was added in the form of irradiated dried yeast at a level of 0.5 per cent of the weight of the ration.

In the low calcium series the diet consisted of yellow corn, wheat gluten, and sodium chloride. Vitamin D was synthesized in the ration by treating it with ultra-violet radiations. A stock rat ration which was unable to maintain normal ash content of bone in female rats during lactation did not lead to depletion of minerals in the incisor teeth, and liberal additions of vitamin D correspondingly had no effect on the teeth.

However, a ration low in calcium when fed to adults over a long period of time was unable to maintain normal composition of teeth or bone even without the strain of reproduction. The sole addition of vitamin D resulted in

almost complete protection against mineral losses, as revealed by analysis for ash and histological examination. For complete protection the ration was probably too low in calcium.—Vera M. Templin and H. Steenbock, *J. Biol. Chem.* 100:209 (Mar.), 1933.

Antimony Poisoning Due to the Use of Enamelled Vessels—In recent years there have been several outbreaks in England of antimony poisoning due to the use of enamelled vessels of inferior quality for the preparation of acid drinks such as lemonade. The first of these outbreaks occurred in the summer of 1928. Lemonade was prepared in a number of new white enamelled buckets and allowed to stand over night. Next morning they were placed in various parts of a building for employees of a local firm.

By noon, 70 of 500 employees had been served, and practically all were speedily sick. Fifty-six of the patients had to be removed in an ambulance. The symptoms were a burning sensation in the stomach, colicky pains, nausea, vomiting, and collapse. In no case did the vomiting amount to hematemesis, and intestinal symptoms were absent. The period and degree of distress varied with the quantity of drink consumed, and in many of the younger girls signs of hysteria were present in addition to the symptoms of poisoning. In most cases the patients were able to return to work within three hours, only two being detained in the hospital over night.

The " lemonade " crystals which were used to make the lemonade were examined and found to contain 80 per cent of sugar, 18 per cent of tartaric acid and 1½ per cent of carbonate of soda. The enamel on the pails contained about 3 per cent of antimony oxide. The tartaric acid had dissolved the enamel and presumably formed tartar emetic with the antimony present. A tumblerful of the liquid was found to contain 1½ grains calculated as tartar emetic, the emetic dose being ½ to 1 grain.

The second outbreak occurred in 1929 at a gathering at which 120 persons were present. The lemonade in this case was made from sliced fresh lemons, and was prepared in white enamelled iron jugs. Twenty-five to 30 persons were ill within half an hour after consuming the drink. The enamel of the jugs was found to contain 9 per cent of antimony oxide.

The third outbreak occurred in 1932 in a large London hospital. Sixty-five of 70 persons present were seized with acute symptoms of vomiting. In this case also the lemonade was prepared from fresh fruit in white enamelled iron jugs.

A warning is sounded against the use of low-grade enamels. These are made from a mixture relatively low in silica content and are fired at a low temperature. They are not acid-proof, and seem to be readily dissolved by citric, tartaric, acetic, and other acids present in foods. The buckets and cans responsible in the above cases were not intended for use with food or drinks, but were so used and there was nothing in their appearance to suggest that they were not suitable. The public should, therefore, be warned that enamelled hollow-ware vessels intended for other purposes may be dangerous if used for the preparation or storage of food or drink.—Ministry of Health, *Brit. Food J.*, 35:24 Mar.), 1933.

Relation of Vitamin A to Cancer—Kuh reports that the study of the effect of varying dosages of vitamin A from various sources on the growth of tumors of mice under controlled conditions showed that the tumor implants of mice were not affected by those amounts of vitamin A contained in the usual diet, supplemented by as much as

500 units of vitamin A. On the other hand, when maximal dosages (1,000 or more vitamin A units) of the provitamin carotene were administered, varying degrees of inhibition of tumor growth were observed.

The utilization of the carotene was limited by a number of factors, including apparent failure on the part of the animal to convert the carotene to vitamin A, this incompetence being due to the absence from its liver of the enzyme carotenase. The problem of inhibiting tumor growth by means of vitamin A becomes one of determining whether more efficient methods of administration can be devised. Two possible procedures are worthy of trial: (1) the feeding of carotene plus the injection of a source of enzyme carotenase, and (2) the feeding of new preparations of vitamin A concentrate.

The administration of the maximal dosages of vitamin A appeared to be without a harmful effect on the animals. This suggests that the inhibited growth of the tumor is the result of a specific action of the vitamin A on the cancer cell.—*Yale J. Biol. & Med.*, 5:123, Dec., 1932 (Abstr. *J.A.M.A.* 100:779, Mar. 11, 1933).

The Antiscorbutic Value of Fresh Lime Juice—A scurvy producing diet of caseinogen, calcium carbonate, sodium chloride, oats and bran was given *ad libitum*. This was supplemented with 5 c.c. cod liver oil daily per animal. Young guinea pigs usually weighing 300–400 g. were used. The juice was prepared fresh daily from ripe Egyptian limes not more than 2 days gathered and was given in daily doses of from 0.5 c.c. to 3.5 c.c. It was found that the minimum protective dose of fresh lime juice is 1.5 c.c. and partial protection is conferred even by the smallest dose given, 0.5 c.c.

Comparisons were made between the Egyptian and West Indian limes since the latter had been employed in previous experiments reported. Ripe fruits were used but the juice was kept in a refrigerator throughout the experiment which was approximately 2 months. It was shown that in both juices the antiscorbutic principle is not stable for a long time. During the experimental period deterioration was such that 3 c.c. failed to protect against the diseases. There seems to be no doubt that loss of this factor takes place at a much greater rate from lime juice than from lemon juice. Previous investigators (*Biochem. J.* 15:83, 1921), obtained slightly better results with green than with ripe limes, thus indicating that loss of the antiscorbutic principle commences with the process of ripening.—Ali Hassan and Rizk Basili, *Biochem. J.* 26:1846, 1932.

Vitamin C and the Suprarenal Cortex. I. Antiscorbutic Activity of Ox Suprarenal—Supplies of fresh ox suprarenal were obtained daily or every second day from local slaughterhouses. In order to avoid possibility of adrenalin poisoning, only the cortex was fed. The antiscorbutic activity was determined by curative tests, and by the microscopic tooth structure method.

In the first test, male guinea pigs, weighing 250 g. were placed for a preliminary period of 10 days on a scorbutic diet of bran, oats, egg-yolk, salt and cod liver oil, alone, and then supplemented by 15 g. of cabbage. Graded doses (0.25, 0.5, 1.0 and 2 g.) of suprarenal cortex were fed and recovery rate noted. Graded doses (.75, 1.5, 3 and 6 c.c.) were fed at the same time to another test of animals. It was found that 2.0 g. of raw suprarenal cortex corresponded very accurately with 6 c.c. of orange juice, 1 g. with 3 c.c. and 0.5 g. with 1.5 c.c.

In the second experiment, young guinea pigs weighing about 300 g. were

given the basal diet with doses of suprarenal cortex at levels of 0.5, 1.0 and 2.0 g. To another set of animals orange juice was fed at levels of 1.5, 3 and 6 c.c. After 14 days the animals were killed and cross-sections of the roots of the incisors were prepared by the usual method.

Raw suprarenal cortex (ox) was found to be a more powerful anti-scorbutic than any natural source known and possesses three times the activity of orange juice. The degree of activity corresponds with the value predicted on the basis of the relative yields of hexuronic acid obtainable from the two sources. It is concluded that vitamin C is either identical with hexuronic acid or is a substance possessing a close similarity to it.

Preliminary results show that in guinea pigs the vitamin C activity of the suprarenal is lost with the onset of scurvy. It is supposed that vitamin C plays a special rôle in the physiology of the suprarenals.—Leslie Julius Harris and Surendra Nath Ray, *Biochem. J.* 26:2067, 1932.

Vitamin A Content of Naturally Colored Nut Margarines—This experiment was carried out to determine the vitamin A content of a number of nut margarines colored by the addition of palm oil. Male albino rats, 28 days of age, and averaging about 59 gm. in weight, were used. These were fed the "colony diet" recommended by the vitamin assay committee of the American Drug Manufacturers' Association. When the body was depleted of vitamin A, which required about 4 weeks, different levels of nut margarines were added to the basal diet, and the experiment continued 8 weeks or until death.

Sufficient vitamin-free cottonseed oil was fed to each animal to make the total fat constituent of the diet one gram per day. To the diet of the animals which were used as controls were added different daily levels of butter. Records of the growth of the animals are given and it was thought some of the growth might be due to the vitamin A in the added milk. Some of the fat from each sample was freed from the salt, water, and curd.

An amount equivalent to the level required to produce an average gain of 3 grams per week was fed to a second series of rats. The average growth curves for these animals were practically identical with those of the animals receiving equivalent amounts of the original sample; this indicated that the vitamin A content was derived from the fat rather than from the added milk. From the results of this experiment it is concluded that palm oil shows promise as a source of growth-promoting substances in nut margarines. —Charles F. Poe and Hazel A. Fehlmann, *J. Indust. & Eng. Chem.* 25:402 (Apr.), 1933.

CHILD HYGIENE

SCHOOL HEALTH PROGRAM FOR THE VIRGIN ISLANDS OF THE UNITED STATES*

SALLY LUCAS JEAN, F.A.P.H.A. (*Life Member*)
New York, N. Y.

UNDER the able administration of Governor Paul M. Pearson, an efficient health department has been developed in the Virgin Islands. Dr. R. B. Stafford, the Director of Health, a member of the American Public Health Association, had had many years of experience in health department activities in this country before going to the Islands.

The population of about 22,000 is more than 80 per cent negro; the white group being chiefly of Dutch, English, Danish, or French origin. English is the language generally spoken. Twelve thousand of these people live on the island of St. Croix, while 500 are on St. John, and the remainder on St. Thomas from where governmental affairs are carried on.

Hospitals were established under the Danish administration before the United States purchased the Islands from them in 1917, and since then have been well administered by our navy, as well as by the civil government appointed in 1931. American and European trained doctors are in charge of the hospitals, each of which has established training schools where native girls furnish service under American graduate nurses. A leper hospital with about 80 inmates is under the able direction of Dr. James I. Knott who serves not only as the director of health for one of the general hospitals, but is in charge of certain local public health activities.

It is thought that the brilliant sunshine probably accounts somewhat for the low record of communicable diseases prevalent, but the availability of medical, surgical, dental, and nursing services with organized welfare activities and a highly developed public health department, tells its own story. Few places in the world furnish as adequate health services as are available to the people of the Virgin Islands.

The school population of 4,000 have a health and dental examination yearly, and free dental as well as surgical and medical service are obtainable by them all. Elementary, junior, and senior high schools are well established and little pressure is required to secure regular attendance as the people desire education for their children. The teaching staff are largely native, supervised by white men and women trained in the United States. The educational standard for teachers is rapidly rising under the progressive and sane leadership of George Ivens, Director of Education.

To ascertain how the school children lived, many homes were visited with Miss Lucy Gillette, the Commissioner of Welfare, who has faithfully and wisely served the people for many years as a public health nurse under the

* At the request of Governor Paul Pearson, the writer spent some weeks during January and February in the Virgin Islands assisting the health and educational authorities in the development of their school health program.

American Red Cross before being appointed in 1931 to her present post. Much time was spent in schoolrooms and in talking with teachers, as well as in conferences with educational and health officials. It was evident that many necessary factors of a school health program existed; indeed, more than are usually found in school systems of our highly organized states, but it was possible to suggest ways and means by which these could be coördinated and so serve more fully the needs of the children. Practical steps were also indicated for the improvement of school health environment and teaching.

The receptive attitude of the authorities leads me to believe that we may, at some not too distant day, find an ideal school health program functioning in these schools.

Though economic conditions are not good, the people seem very well nourished. Rice, fish, bananas, and sugar cane are their chief diet, but this is now being enriched due to the encouragement which the government is offering whereby the people can grow and consume more vegetables. Fresh water is scarce because of the coral formation of the Islands, and the rain water is carefully husbanded in cisterns, but lack of water does not prevent the people appearing clean as to body and clothes. The sea is available to all and a definite effort is being made to encourage bathing in the sea regularly.

The beautiful bodily carriage noticeable on all of the islands can probably be attributed somewhat to the custom of carrying water on their heads, as well as other heavy burdens.

They are dignified people, courteous and polite, and have great pride in the magnificent natural beauty of their islands with deep green tropical growth covering the high hills.

The sapphire and emerald waters breaking on the coral strands made famous in poetry and song, are all here, with quiet, peaceful people proud of their citizenship in the U. S. A.

CHILD HEALTH IN MINING CAMP AND VILLAGE

IN April, 1932, the Save the Children Fund of America requested Dr. Iva M. Miller "to make a survey of the situation as regards children's health in Harlan County, Ky., one of the most populous of the Southern Appalachian coal mining counties, where unemployment has rendered a difficult hygienic and sanitary situation even more difficult. To study the problem of children's health meant that a general survey of the whole community's health and environment should be made." Beginning with reports of the Bureau of the Census and the State Board of Health, and aided by the various physicians in the county and by city and county officials, educators, missionaries, pastors, business men, the State Health Officer and his colleagues, and the Harlan County Save the Children Fund Committee, with Rev. C. E. Vogel, pastor of the Harlan Church, as Chairman, she proceeded to study Harlan County.

Among the significant facts discovered was this hint of the development of Harlan's coal mining activities, as seen in the growth of the county's population:

Census	*Population*
1890	6,197
1900	9,838
1910	10,566
1920	31,546
1930	64,557

The increase of 198 per cent in population between 1910 and 1920 is an index of the amazing—and as we see it now, the appalling—inflation of the coal industry during the World War. Some of the horde of new miners came from outside, but many came

from neighboring mountain counties. During the next 10 years the population more than doubled again, partly due to incoming migration, but also in considerable degree to the high birth rate, which in 1931 was reduced to a few points above that of the state of Kentucky as a whole.

The rapid increase of population greatly complicated the problems of sanitation and health. When a community thus greatly enlarged was stricken by a decline in the prosperity of the coal industry, throwing thousands of men out of work, and necessarily making the living conditions of their families worse, the results were disastrous. The preponderance of mine employees in the county is shown by the population distribution in 1930, which is given as, urban 6,596, farm 4,623, and rural non-farm, mostly miners and their families in small camps, 52,968.

In every community, it is possible to obtain a few relevant facts which are indices of the health of the community. Among these is the rate of infant mortality. If this is higher than that of an adjacent community or state, one or more of the several facts may bear part of the responsibility; either the drinking water is unsafe, sewage disposal is unsatisfactory, grade A milk is not available, or the child's food is not being selected, prepared, or administered according to the best ideas of hygiene and sanitation.

The water supply of the city of Harlan was found to be excellent, but that of the rest of the county more or less questionable; mostly wells and springs and, except in a few mining camps, uncontrolled. The county, like many another in the United States, discharges its sewage in the natural streams, all of which are therefore more or less polluted. Two large mining towns have modern plants; but many others are not so happy.

On the positive side the County Medical Society, with 50 members, was found to be a strong influence for health.

The physicians of the county are unusually well trained, and some are especially skilled in surgery. Their monthly meetings are well attended, and the programs presented are of a type which few county societies in America can surpass in quality.

Dr. Miller's report and recommendations—considerably more searching and voluminous than these few hints indicate—seemed to win the full approval of the State Board of Health and the Save the Children Fund.

Realizing that bad health in the majority of cases results not from accident but from negligence or lack of knowledge how to use the means we have for good health, the Save the Children Fund decided to place a Child Health Demonstration in Harlan County, and asked Dr. Miller to serve as its Director. Florence Dunkelberger was engaged as Public Health Nurse, and W. S. Johnson as Sanitary Inspector—both experienced workers in Kentucky.

The work was begun in August, 1932. Outside of the city of Harlan, 8 child health centers for demonstration work were opened —in churches at Evarts, Cumberland, Black Mountain, Benito, Wallins Creek, Alva, Loyall, and Sunshine. Around these centers, committees of local women under Miss Dunkelberger's direction made contact with most of the mothers in the community and took a census of the children under six years of age.

Periodically every 4 to 6 weeks these centers are opened for conferences to examine children and to instruct the mothers. Just prior to the conference, a post card is mailed to each mother, suggesting that she bring Johnny and Mary and Susan and perhaps Ann to the church on the appointed day. And when 50 or 75 mothers show up, with from 1 to 3 or 4 children apiece, it means a busy day for the staff, even when, as in several cases, local physicians have generously aided the Director in giving the health examinations.

Attitudes as well as numbers make conference days difficult. The greatest stumbling block to progress is fear—fear not primarily in the mind of the child, but in the mind of the parent, from whom it is communicated to the child. The babies who have barely reached the point of elementary thinking have imbibed this traditional fear of doctors, and evidently suspect that the examination is going to be some sort of fearful ordeal. The result is that many of them yell, squirm and kick like mule colts, and doctor and nurse get pretty well pommeled before the seance is over.

As an indication of the unfavorable conditions which were found among the first 400 children examined, all of preschool age, it may be mentioned that

. . . 93 per cent of them needed immunization against smallpox, 90 per cent needed such

protection against diphtheria, 84 per cent needed cod liver oil, 68 per cent were receiving less than their necessary quota of milk, 37 per cent needed treatment for worms, not to mention several other items.

For those requiring cod liver oil—not a medicine for tubercular cases only, but a necessary food for a child from birth until he is 6 years of age, save during the summer when he can take sun baths—we gave to such parents as were unable to purchase it, sample bottles to last until our supply should arrive. A few days ago two tins of 5 gallons each came to Harlan as a gift for use among our neediest. A generous druggist is having it bottled for us and will aid in distributing it among those who can come to Harlan.

The mothers are instructed as to the health care and habits of the children, and those youngsters having physical defects are referred to their family physicians for correction. As soon as all physical corrections are made and the diet and health habits adjusted, so that they have no health liabilities, only health assets, these boys and girls whom we have examined are written off as Blue Ribbon children. They do not come to the conferences again save to be checked up before being reported. In this way we eliminate numbers. When all become Blue Ribboners, our work will be completed—or rather, it would be, save that new births will extend it a while longer.

Now that the mothers are learning the nature of our work, they are responding more heartily to the calls. Some bring boys and girls well along in their teens and beg to have them examined. . . .

One thought on which we are hammering, and which, if we put it over, will be one of the best effects of our work, is that of the value of the careful, unhurried examination made by the public health doctor when the child is apparently well, in contrast to the panicky, hurried and difficult examination of a child who has shown warning signs of illness for days and perhaps weeks.

Milk is a commodity which cannot be obtained in sufficient quantities in Harlan County. In 1920 the county had no dairies at all. This year there were 24, owning some 500 cows, while 3,500 more cows are privately owned. But still the milk supply is far below what is needed. There are 12,000 children under 6 years of age in the county and 23,000 under 21, that is, still in the growing period. To supply adults with their needed 1 pint a day and each child with 1 quart would require some 50,000 quarts—and the supply is fully 30,000 quarts short of that.

It is therefore planned to introduce milk goats into the mountain regions to supply families where there are small children. It is planned to loan one or more goats to a family until the members are financially able to take them as their own. A good milk goat should produce 1 gallon per day. Goat milk is rich in iron and some salts not found in cow's milk, and the cost of keeping a goat is very little, even in winter. It is hoped that a goat farm may soon be started at one of the settlement schools in the mountains where goats will be bred to supply the needs in several counties.—

Iva M. Miller. *Mountain Life and Work,* Jan., 1933, p. 5.

PUBLIC HEALTH NURSING*

Behavior Aspects of Nursing Education—Behavior is a hard topic to discuss because everybody feels able to express expert opinion on it. We accept data coming from the fields of chemistry, bacteriology, engineering, but we do not like it when the behavioristic sciences of psychology, psychiatry and sociology try to make us see ourselves as we really are. The reason for this is that for hundreds of years the activities of human beings were ascribed to body, mind, and soul. Clergy and teacher took care of everything above the eyebrows, and activities originating there were called conduct. The doctor took care of everything below the eyebrows. Wundt, a German in the 19th century, first tried to apply scientific methods of approach in a study of human behavior. Now while conduct is a matter about which we pass laws and give advice, behavior is

* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

a matter which implies only a casual interest in a human being's actions. Yet there must be a wealth of important facts behind various charges in the courts preferred against boys and girls under 16 years of age.

Psychology and psychiatry merge into each other because we are always dealing with varying degrees of abnormality. It is because we recognize in the neurotic, the insane, the feeble-minded and the delinquent so many of our own characteristics, that we feel so free to judge them and prescribe all sorts of advice for their welfare. "As a rule it is far easier to get over a new and unwelcome idea to a factory hand with a mental age of ten years than to put across a similar concept to a person who has practised a profession for years."

Most so-called educated people think gross irrationality is the only symptom of poor mental health, when the mental states that really do the most damage are "mental attitudes of rigidity in thinking, and of impulsive abandonment to emotional undercurrents of jealousy and egotism so often rationalized by the espousal of half-baked theories of omniscience."

Psychiatry has all the characteristics of an overgrown adolescent. The first school of psychiatry damned everybody because of his ancestors. That is now outgrown. The second school was that of focal infection, which thought that all nerves, irritability, tantrums and rage were due to terrible poisons in the large gut, which could be removed by colonic irrigations. The third school is that of endocrinology. We know little about the glands of internal secretion but we talk a great deal about them. The last school is psychoanalysis. All these schools contain important truths, but the danger is for each to regard its trend of thinking the one and only way of life.

Nursing schools in their striving to be academic must not take over what progressive education is fast discarding. One great teacher-writer speaks of the overestimation of the function of books in the development of intelligence, saying, "A genuinely integrated learning and discipline cannot be attained without an integrated relationship of teacher and pupil."

We accept the principle of individual differences in courses in psychology, physics, and biology, but fail to act upon it in our human relationships. Much medical and nursing energy is expended trying to make fat people lean or lean people fat, when a thousand experts on every phase of growth and development in White House Conference Committees refused even to express an opinion as to what constitutes a state of nutrition. The mental health of an individual depends on his biology and temperament as much as on his intellect, yet education has attempted to standardize its products by evaluating intellectual ability alone.

Interest is increasing in the material taken into nursing schools. Raising educational standards does not entirely solve the problem. Usually the candidate's history and credentials give only an estimate of intellectual performance; personality and make-up are important, also. Personal interviews are perhaps most satisfactory in the right hands. The period of probation needs to be elastic in its expansion of doubtful material.

All Class A nursing schools recognize the necessity for practice and theory in psychiatry. Let the nurses study textbooks in psychology and psychiatry, but who has ever seen texts that deal with the really practical aspects of mental hygiene as they affect everyday living, such as jealousy and self-pity and difficulty in taking criticism, which give us all so much trouble in the management of ourselves and others?

There are matters too, that deal with good taste and manners and plain, common sense, but they are hygienic, nevertheless.

The nursing school curriculum is gradually paying more attention to practice and theory in the field of public health. This phase of preventive medicine has been considered post-graduate material, but because it deals with factors underlying poor physical, mental, and social health, it logically belongs in the undergraduate curriculum. Medical student and pupil nurse need to go with social science into the homes and schools to see conditions of living and education; to see how parents struggle for a livelihood and children get their start.

Social science today is far ahead of public health in its grasp of the problems of human relationships. Public health has doctors and nurses who see only the physical aspects of poor health, and only the problem of relief in social science, while they completely ignore the fundamental principles of social case work, which are so closely related to eugenics, social psychology, and progressive education.

Is it lack of interest, or professional inertia that makes it possible for public health to ignore the preventive side of a branch of poor health whose victims fill more beds in public and private hospitals in this country than all medical and surgical cases together? Although it is ethics for the nurse to go no faster than the doctor in professional vision, yet I believe that the public health nurse has a great chance in her daily work to drive home to public health medicine a larger concept of health than it has today.

A behavioristically intelligent nursing school faculty is just as important as selection of student material and construction of curriculum. Colleges and universities think it is the business of students to look out for themselves so they shy away from personnel departments which industry and big business have found practical. In the larger nursing schools the educational director can serve as personnel director if she does not have too many students, but she needs to know the individual student nurse from the moment of her entrance to the day of her departure.

Beneath the failures and breakage of the world one invariably finds a long story of poor emotional balance—discrepancy between ambitions and capacities, a floundering with appetites and urges and personal consciousness of inadequacies.

Yes, the greatest value of any educational discipline is the training of the emotional life of an individual.—Esther Loring Richards, Behavior Aspects of Nursing Education, *Bellevue Quarterly*, Mar., 1933.

Miss Wald and Henry Street Settlement Have Birthdays—March 10 marked the 40th anniversary of the founding of Henry Street Settlement and the 66th birthday of its founder, Lillian D. Wald. On this occasion Miss Wald received at her country home in Westport, Conn., telegrams of congratulation from Governor Lehman of New York, and from President and Mrs. Roosevelt.

The first "Nurses' Settlement," later known as Henry Street Settlement, was founded in 1893 by Miss Wald and a coworker, both graduates of the New York Hospital Nursing School. These nurses, in relating their work to the social, economic, and industrial conditions that affected their patients' lives, gave an impetus to the development of visiting nursing. The Henry Street Visiting Nursing Service has served as a model for communities throughout the country. Last year its nurses made approximately 600,000 visits to 100,000 patients in New York.

Miss Wald lives at the Settlement at 265 Henry Street, New York, and is head worker and Head Resident.

The Settlement conducts clubs for boys and girls as well as for mothers and fathers of

the neighborhood; classes in arts and crafts, pottery, dancing, English, citizenship, homemaking, first aid; clinics for the mothers and babies, the boys and girls; a music school in which courses are given in all phases of musical study; a theatre and dramatic workshop; social events for the young people; and in the summer time, camps for the boys and girls, a daily play school, and day outings for the mothers and children of the neighborhood.

The administrative headquarters of Henry Street Visiting Nurse Service where Miss Wald maintains an office, is at 99 Park Avenue in a fine building constructed under Miss Wald's leadership and presented to the Service by Mrs. Jacob H. Schiff in memory of her husband. Mr. and Mrs. Schiff were devoted friends of Miss Wald and took active personal interest in the Settlement from its earliest beginnings. Over the fireplace at 99 Park Avenue is this inscription:

> This building is given in memory of Jacob Henry Schiff by Theresa, his wife, and is dedicated to the cause of public health nursing, which he long fostered, for love of progressive education, civic righteousness and merciful ministration.

Nursing training and service as carried on in the hospitals in the '90's were divorced from the families in which their patients came. Miss Wald and her nurses gave nursing a new status by going out into the homes and, by giving hourly service, paid for by the family when possible, brought private nursing within the reach of those with small means or no means at all. The nurses responded to calls from the people themselves and from social agencies, but gave no treatment except under the supervision of a physician. Leaders in the medical profession supported this change of basis in nursing service, but it was fought vigorously by quacks. There has always been a huge field for this service since it has been found that 90 per cent of sickness is cared for in homes.

From the beginning of her nursing career Miss Wald was an insurgent and innovator in the care of the sick, the oldest of woman's functions. She was the first president of the National Organization for Public Health Nursing when it was founded in 1912. She was one of the prime movers in getting a generous endowment which made possible the Nursing Education Department of Teachers College, Columbia University. She brought the idea of school nursing from London in 1902 and offered the services of one of her nursing staff to give a demonstration among school children in New York City. After a month of the demonstration the city made an appropriation for the first public school nurses in the world. Now every English speaking country and many others have adopted school nursing. She made the first suggestions and moves which led to the formation of the Town and Country Nursing Service developed by the American National Red Cross in 1912. She initiated the idea of the Children's Bureau in Washington established by act of Congress in 1912.

It is difficult to measure the contribution Miss Wald has made to social welfare in this country and the world. An editorial entitled "Henry Street" in a New York newspaper referring to her says,

> One has but to substitute her name for its English equivalent to make Wordsworth's lines offer suitable tribute to her on this her birthday:
>
> "One impulse from a vernal wood
> May teach you more of man
> Of moral evil and of good,
> Than all the sages can."

REFERENCES

Dock and Stewart, *A Short History of Nursing*, 1932, pp. 162, 165, 305, 312, 315.

Biographical Sketch of Lillian D. Wald Henry Street Nurse Service.

Public Health Nursing Notes, *A.J.P.H.*, XX, 2: 218 (Feb.), 1930.

Midmonthly Survey, Mar., 1933, p. 111.

EDUCATION AND PUBLICITY*

Motion Picture Memoranda—Several memoranda of sources for securing pictures, information as to new pictures, and use of pictures. Supplied by Social Work Publicity Council, 130 East 22d St., New York.

"Motion Pictures—Sources for securing by loan, rental or purchase." 2 pp. *3 cents.* Not a list of individual pictures or producers, but of free or inexpensive source lists, and new picture information sources. Pictures for entertainment or education in clubs, camps, institutions, etc. Makes accessible the wide field of 16mm pictures.

"Health Motion Pictures." 2 pp. *3 cents.* Source lists and national health agencies supplying pictures. Supplementary to memorandum above.

"Amateur Movies." 5 pp. *6 cents.* Why, where and how to make useful this exceptionally valuable instrument for the presentation of the health department, the health association, as well as personal and community health. *Offers a project for high schools and colleges.*

"List of Amateur Movies." 2 pp. *3 cents.* Examples of pictures made on health and social work.

To readers of the *Journal* outside of Canada and United States: copies of above memoranda will be sent free without enclosure of postage.

Publicity First Aid for Nursing Groups—The Public Information Kit, designed for publicity chairmen of state, district and alumnae associations, is arranged in a fiber portfolio, compact and easily accessible, and contains a table of contents, making it easy to put one's hand on the items wanted at the moment. Concrete illustrations of all the points made are listed. The "do's" and don'ts" of good radio speeches are given with mimeographed illustrations of what points a good radio speech should contain, and warnings of the difficulties of getting the "diabolic's" safely through the microphone.

Concrete advice as to physical make-up of a publicity release is given, as well as guidance in the actual content, and suggestions as to photographs and a method of keeping them. There are "fifty-seven varieties of public health nursing news" items listed which can be lifted bodily from the kit, and the locale and names of the board, etc., changed and used in any part of the country. In addition to this digest which can be elaborated on (happily for the publicity secretary who may be in need of ideas) several pages devoted to the preparation of feature articles, show how local color may be added to a news item to make it a good feature.—Stella A. Koenig, Henry Street Nursing Service. American Nurses' Assn., 450 7th Ave., New York. $1.50. We wonder whether it would not have been better to perforate the various sheets and publications. Some of the users might then have put the contents into a loose-leaf binder. We expect to do this to illustrate the possibility when the Kit is shown at Education and Publicity Headquarters in Indianapolis. *We would like to hear of other such kits offered by national or state groups.*

Explaining Emergency Diets—The explanation of emergency diets

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

seems to offer an opportunity for simple dietary instruction. Criticism of emergency dietaries by food faddists and the uninformed may be blunted by careful explanations of the foods allotted or suggested. Why certain items are useful, and others are not, may be stated in strictly non-technical language with a minimum of scientific information.

It seems important to make clear that we are dealing only with emergency conditions. There is danger in such a statement as that "no family needs to be undernourished today even if reduced to the weekly food order provided by the emergency relief funds." This was the lead sentence of a news release widely distributed in one state.

Dieticians and health agencies might well make clear that the adequacy of the relief diet depends upon the community. The specialists are merely helping to make the most of a bad situation.

Some Instruments of Public Information—Do you secure interest through variety in methods? Do you overlook desirable methods in carrying out a particular project? As an aid to affirmative answers to those questions we give a check-list to be cut out or copied for everyday use. Please suggest additions to this list.

1. Newspapers—News (general or departmental), letters to the editor or "Voice of the People," official statements or proclamations, editorials, picture page or rotogravure, feature stories, Saturday or Sunday magazine articles, advertisements.

2. Special local publications—Weekly, monthly or occasional publications issued by religious, club, business, school, or fraternal organizations, or addressed to a neighborhood or other special audience. These are called house organs, bulletins, magazines, news letters, and so on.

Articles in above. Publication of one of your own.

3. Publicity by mail or direct distribution—Letters, enclosures with letters and packages, annual reports, reports of studies, posters and bulletin board posters, leaflets and folders, booklets and pamphlets, postal cards or post cards, announcements, invitations, etc.

4. Speaking—Talks at clubs, schools, industrial plants, etc., emergency mass meetings, annual meetings, board meetings, anniversary dinners, conferences, classes, invited groups at homes or clubs.

Radio programs.

Possibilities in all the above: Questions and answers, dialogues, plays, etc., etc.

5. Graphic and dramatic methods—Sightseeing tours or visiting days, exhibits, window displays, contests, talking pictures, silent pictures (including amateur pictures), slides, plays, pageants, parades, demonstrations of methods.

6. Intensive campaigns—Money raising campaign; special educational day, week or montn.

7. Personal contact—Personal calls, house-to-house canvass, telephone calls.

"On the Air"—A booklet bearing this title has been issued by the Medical Information Bureau of New York Academy of Medicine, 2 East 103d Street, New York. It seems to be of such practical value that we give it here in full. Copies in booklet form free from Dr. Iago Galdston, above address.

The radio talk stands in a category by itself. The radio speaker is faced with a number of conditions which he does not meet in his other talks. His radio audience is vast but unseen. He can draw no inspiration from the sympathetic eyes of his hearers. The average radio studio even robs one of the companionship of one's own voice, for the room is soundproof, all echoes are deadened, and one's voice sounds muffled.

The radio speaker's audience is mixed. He addresses the young and the old, the rich and the poor, the educated and the illiterate.

These special conditions make necessary a special technic in the composition and delivery of the radio talk.

To begin with, the radio health talk should be written out in full and never delivered from notes or extemporaneously.

Make sure that your manuscript is clearly written and that its pages are arranged in proper order. Before broadcasting, read and re-read your paper. While radio papers must be written out, they should not be *read* over the radio; they should be *spoken*. It is

therefore desirable to indicate by signs of one's own composition where special emphasis of tone and voice need be given to what is written. Such signs will help in effective rendition. They act like the markings on a music score.

Be brief in your paper, as a whole, and in sentence and paragraph structure.

Use simple language. Avoid technical and rare terms, or, if obliged to employ them, be sure to define them.

Do not try to cover too much ground in one radio talk. Be content with but one point, if need be, so long as you succeed in making that one point clear.

Summarize your talk at the end—but not in the form of a deliberate summary. Some may have tuned in on the middle of your talk and may wish to know what you said in the beginning.

Be very careful of what you say. Remember that your talk goes into the homes of laymen and is listened to by mixed company. The radio audience is squeamish, touchy, and finicky, and is hemmed in by many taboos. It is readily repelled by detailed descriptions of pathologic conditions and by gory pictures. Many scenes which are commonplace to the medical man are repulsive to the layman. The scientist in his enthusiasm for modern aseptic surgery, will say, "Not even the heart and brain are considered too sacred to be forbidden the exploration of the surgeon's knife." The lay person, when hearing this, is not as much impressed with the marvels of modern aseptic surgery, as he is repelled by the picture of the surgeon's knife exploring the brain or the heart.

Avoid, if you can, in the composition of your papers, direct reference to excreta, to bloody discharges, etc. If you must dwell upon them, use such expressions as will not offend the radio audience.

Avoid time-consuming preliminaries in your speech. Don't tell your audience what a wonderful thing radio is (they know it), or how nervous you are, or how grateful you are to Station XYZ for this marvelous opportunity, etc., etc. Greet your audience and plunge right in.

The informal tone of a conversational style of composition is very effective over the radio. Tell a tale, if you can. The radio audience is more interested in Mr. Jones around the corner who had a little growth on the lip which Dr. Smith advised him to have removed, which was removed in the Henry Street Hospital, and which was found to be a developing cancer, removal of which at an early date is a triumph of surgery, than it is in the plain fact that new growths on one's lips are dangerous. Of course, all names should be fictitious, especially those of the doctor.

The radio audience is the news-reading public. Hang your tale, if you can, onto some current event with a health slant. Make your talks seasonal, or give a season value to your talks.

The first five sentences of the radio talk should be so written as to bait the listener and compel him to attend to the rest. Select your topics carefully, with a mind to the heterogeneity of your audience. Let your titles be provocative of curiosity and interest.

Speak your paper softly, clearly, slowly. Be especially careful not to swallow your last syllables.

Time your self beforehand, so that you need not hurry your cadence, nor leave the last few paragraphs of your talk unsaid.

You may talk standing or sitting. Most radio talks are better delivered while standing.

Be sure that the announcer has your "topic" properly presented in his introduction. Use only *one* title with your name.

Another Health Education Institute—A second time, so it is planned, a Public Health Education Institute will be held in connection with the Annual Meeting of the A.P.H.A.

Who will attend an Institute at Indianapolis in October? Where will they come from? What kinds of health work are they doing? Such information will help to confirm the idea and aid in the planning. If you would like to attend please drop a postal card to the A.P.H.A. Formal registration will come later.

Teaching of Health—Do you conduct classes, conferences, discussion groups, talks or lectures, or other forms of consecutive presentation of any phase of personal or community health to groups of children, young people or adults?

The Public Health Education Section and this department of the *Journal* would like to hear from health departments or associations, state or local, which carry any of the above in scout

troops, clubs of young people or adults, in a Y.M.C.A. or Y.W.C.A., recreation center, in offices or factories, or elsewhere.

Especially would we like to know of such efforts in reaching those not already organized in groups. Please tell how you find them and get them together in group form for consecutive presentation of personal or community health.

Also, do any other public or private agencies in your state present health in a series of sessions to organized or unorganized groups?

Geography of the Health Education Institute—The following had one or more representatives in the Public Health Education Institute, October, 1933:

Towns and cities, 54; states and provinces, 28; the latter grouped as follows: province, 1; states east and north, 12; D.C., 1; south, 9; west of the Mississippi, 5.

On the list by states the first figure is the number of cities represented; the second is the number of individuals:

Ontario, 2–2; Alabama, 1–1; Arkansas, 1–1; Connecticut, 2–4; D.C., 1–8; Georgia, 2–2; Illinois, 2–8; Indiana, 1–1; Iowa, 1–2; Kentucky, 3–3; Louisiana, 1–1; Maryland, 2–4; Massachusetts, 5–9; Michigan, 4–7; Mississippi, 2–3; New Jersey, 4–4; New York City and Brooklyn, 11; New York State, 7–9; North Carolina, 1–1; North Dakota, 1–1; Ohio, 2–3; Oklahoma, 1–1; Pennsylvania, 5–9; Rhode Island, 1–1; Tennessee, 2–5; Texas, 1–1; West Virginia, 2–3; Wisconsin, 1–1; Virginia, 1–1.

"The County Fair Is Next Week"—"Where can we get an exhibit?" "Send us an idea for our exhibit?" Before long these and similar questions will reach state and national health agencies.

Now is the time to start planning for the county or state fair. And a well planned exhibit is more important this year than ever before.

Will national agencies and state departments and associations now remind their constituents that requests for ideas and information are due several months before the fair dates?

Health Education in Boston—Ruth I. Parsons and C. E. Turner made a study of the school and out of school health education during the school year of 1931–1932, which is reported in *New England Journal of Medicine*, 8 The Fenway, Boston. Jan. 5, Jan. 12, Jan. 19, 1933. *25 cents* each issue.

The aims of this survey have been threefold:

1. To determine what agencies are carrying on Health Education in the city.
2. To determine the quantity, quality and adequacy of the work which each is doing.
3. To suggest ways of strengthening the present program of Health Education.

This study was made by the Health Education Research Laboratory of M.I.T. at the request of the Boston Health League. It offers a detailed picture of health education activities by governmental and voluntary agencies, including "organizations whose field is broader than the city of Boston but which contribute directly to health education in the city."

It is recommended "that the Health Education Committee of the Boston Health League should function as a Health Education Council."

A reprint of the three articles from Boston Health League, 43 Tremont St., Boston, Mass. Send *5 cents* to cover postage.

MEETING DEPRESSION

"A Half Century's Health Progress," in *Crusader*, Wisconsin Anti-Tuberculosis Assn., Milwaukee. Dec., 1932. Conditions in 1882 and 1932 contrasted. This illustrates one possibility of emphasizing health progress and the importance of present-day health services.

"The School Superintendent and the Health of Children in the De-

pression," by Dr. Thomas D. Wood, Joint Committee on Health Problems. The title might be changed to "The Community and the Health of the School Child in the Depression." National Education Assn., 1201 16th St., Washington, D. C. Samples *free;* low rates for quantities.

Selected mortality figures for 1914 and 1932 appear on cover page of *Health Bulletin,* North Carolina State Board of Health. March, 1933. Part of the editorial application follows:

> You want to remember that the better record of 1932 is not an accident. It is the result of persistent, intelligent, scientific efforts. Any lapse in vigilance may mean the return of typhoid fever in every community this or next year. But public health protection, like police and fire protection, costs some money. Are you willing to make the small financial sacrifice necessary for your own safety?

Here are some figures being quoted in New York State: The school district expenditure dollar in New York State, 1931, included the following: health, 1 cent; sanitation, 4.5 cents; recreation, 1 cent; highways, 14.5 cents; education, 37.5 cents. This according to Bureau of Municipal Information, Albany.

A strong plea to halt budget cuts, from *Birmingham's Health,* Birmingham, Ala. Dec., 1932:

> In 1932–33: 5 white nurses, to serve distress and educate in health, an area greater than the sovereign State of Rhode Island—two sanitary inspectors, to police a county 50 miles long and 30 wide, and in addition to post quarantine over every case of communicable disease therein—2 food inspectors, to cover every food store, jobber and distributor, every restaurant, every alley hot dog stand in the Fourth City of the South—one quarantine officer to quarantine every case of disease in that city of 300,000, and to do it within an hour or so after its reporting—
>
> But why continue? Citizens of Birmingham are proud of their Department of Health; confident that it is so adequate that never again can pestilence threaten!
>
> More than any other phase of the business cycle, a great depression strains all the facilities of a department of health. More calls for nurses—tremendous increase in the demand for laboratory service—a thousand problems for inspectors—the increasing watchfulness necessary of the unscrupulous anxious to cut corners at the price of the public's health—all these and many other demands arise in a continuous crisis in which the department of health is expected to act promptly and decisively. In grave danger is that city whose health forces meet that crisis with full half their resources gone!

There is an opening now for exhibits in popular teaching. Displays might be worked out to teach wise food buying for the average family, as well as displays showing the reasons for the food combinations recommended for inadequate relief budgets. Also displays showing how to make relief food diets as palatable as possible, are well worth while.

Such displays may be arranged at neighborhood centers of various types. Staff members need give time only to stimulating the idea. The displays may well be carried out by volunteers, with a dietician or home economist as consultant. The possibility of enlisting students in home economics is illustrated by "A Demonstration of Wise Buying," by Heywood and Potter, in *Journal of Home Economics,* Baltimore, Md. March, 1933. *30 cents.* The plans outlined could be adapted to other cities. Probably some of the suggestions could be applied to relief diet displays. When such displays are presented to non-relief groups their emergency nature should be emphasized.

"Community Programs for Subsistence Gardens," by J. C. Colcord, is due for publication by Russell Sage Foundation, 130 East 22d St., New York. Intended to guide local relief groups. Deals with "First Steps In Setting Up a Garden Program," "Main Problems of Organization," "Working Conditions and Supervision," etc. It does not deal with strictly horticultural problems.

NEW OR DIFFERENT

National Health Review, Dept. of Pensions and National Health, Ottawa, Ontario. A new quarterly, substituted for former monthly bulletin. A new editorial policy calls for one leading article an issue, news from the provinces, and classified "Abstracts of Current Public Health Literature."

New Mexico Health Officer, Santa Fe, N. M., has changed from monthly to quarterly issues; increased number of pages; added colored paper covers.

Child Health, Oregon Tuberculosis Assn., Portland, Ore., will continue as a bi-monthly.

Erie County Echo, Health Education Service, Buffalo Tuberculosis Assn., 708 Ellicott St., Buffalo, N. Y. "Health Teaching Suggestions for Teachers." Mimeographed. Sample, *3 cents.*

Canadian Health, published quarterly by Canadian Social Hygiene Council, 105 Bond St., Toronto. *50 cents a year.* "Devoted to the promotion of personal and community health."

The Health Officers' World, International Society of Medical Health Officers, 505 West Cherry St., Milwaukee. Quarterly. *$1.00 a year.*

A semi-monthly *News Bulletin,* Ohio State Dept. of Health, Columbus. To supply news copy for use by health commissioners of the state.

News-Week, 1270 7th Ave., New York. More or less like *Time.* To be added to some mailing lists.

TRAINING

A social hygiene study course appearing in *Public Health Nursing,* 450 7th Ave., New York (starting with July, 1932, issue), is available as 8 reprints at *10 cents* each. Intended for group discussion or individual study.

A "Study Program in Publicity for Board and Committee Members," appearing in *Public Health Nursing,* starting with Sept., 1932, issue, is available as reprints at *10 cents* each. Already issued: "Outline for Analysis of Past Year's Publicity"; "Interpretation: Why, What, Who"; "Newspaper Publicity"; "Feature Stories and Special Column Material"; "Public Speaking"; "Use of the Radio"; "Exhibits." The series will total 9 sections.

Both of the above courses should be useful beyond the nursing field.

DATES AHEAD

May 14, 1933—Mothers' Day. Address: Maternity Center Assn., 1 East 57th St., New York, for plans and materials.

REPORTING

"Investing In Health" is a review of the activities and services of the Welfare Division of Metropolitan Life Insurance Company, New York. Includes 8 diagrams of death rates, 1911–1932. *Free.*

"Palama's 1932 A Great Year" is Philip S. Platt's annual report for Palama Settlement, Honolulu. It is a 4-page, letter size folder, with display, pictures, "What Our Work Cost," significant statistics, "Extra Dividends" through "varied services rendered the community by Palama staff workers outside the routine of their work," and a first page letter addressed to "the multitude of Palama Settlement's friends who receive this report." By using old cuts, but one, the 5,000 copies cost 4 cents apiece.

BOOKS AND REPORTS

Report of the Water Resources Commission of Maryland to the General Assembly of Maryland.

A report to the General Assembly of Maryland by the Water Resources Commission of that state, setting forth recommendations as to the policy, legislation and methods of financing for the preservation of the water supply resources of the State of Maryland is noteworthy in many respects. The Commission was charged with the duty of

> . . . reviewing the underground and surface water resources . . . and of formulating a plan for the preservation, allocation, control and regulation of such water supply resources for the maximum public benefit, safety and use.

The Commission fulfilled its duty. In spite of the very complete, comprehensive mass of related data collected, the summary is reduced to a little more than 1 page and the single recommendation to 1 sentence. However, the brevity of the recommendation does not detract from its importance. This Commission recommends the creation of a permanent water resources commission for the state with general powers to formulate

> . . . a water conservation policy, to control the priority, purpose, period, place and quantity of use of water, and to provide for continuity of stream gauging and for the supervision of dams.

One of the most important compilations of information in the report is that showing the water resources control in all of the states. Briefly it summarizes statements of pertinent legislative authority. Maryland is shown to have no body controlling water and water structures and development and conservation. With this knowledge the suggestion of this Commission has much greater importance. In this day it is of interest to note that because of collaboration between existing state officers, this Commission was able to turn back almost half its appropriation of $5,000. ARTHUR P. MILLER

Report of the Medical Research Council for the Year 1931–1932—*London: His Majesty's Stationery Office*, 1933. Price, 2s net.

This report is full of interesting information on almost every medical subject. The research work of the Council is reported under 7 heads, and being in the nature of a summary, does not lend itself readily to review.

We note with regret the opinion that the common belief that the Manson-Ross discovery had rid the world of malaria has had a bad effect in checking the development of research work. Although 40 years have elapsed, the indication is that there are more cases of malaria today than formerly, and the financial loss due to the disease is incalculable. The world uses approximately £2,500,000 worth of quinine annually, of which more than £450,000 worth is consumed within the British Empire. It is estimated that 47 million cases of malaria could be effectively treated with the amount of quinine purchased in the world. Studies are constantly being made on the new synthetic compounds for the treatment of malaria.

The work on dog distemper has been closed because its object has been achieved. The incidence of distemper among 650 inoculated animals has been only 1.4 per cent, with 0.3 per cent of deaths, against practically 100 per

cent formerly, with a death rate running from 50 to 75 per cent. The money for this work was supplied by the Field Fund, of which some $75,000 was contributed by the United States.

Maternal mortality continues to be a problem, and excellent steps have been taken to study the disease and bring it under control. Vitamins also continue to attract much attention, as do virus diseases, bacteriophages, etc. Owing to new methods, the tubercle bacillus is yielding its chemical secrets.

Nutrition receives the due amount of study and the relation of dental disease to diet is still under competent investigation. Indeed, as before said, there is scarcely any subject of interest to the medical profession to which reference is not found, and this includes prevention as well as treatment, both medical and surgical.

The grant-in-aid fund by Parliament for the period of the report was £139,000—£9,000 less than for the preceding year.

The report is valuable also on account of the references given, many articles having been already published in various journals.

MAZÝCK P. RAVENEL

100,000,000 Guinea Pigs: Dangers in Everyday Foods, Drugs, and Cosmetics—*By Arthur Kallet and F. J. Schlink, Consumers' Research, Inc. New York: Vanguard Press,* 1932. 312 pp. Price, $2.00.

Fact and fancy run riot in this "hard-hitting book by two technical experts," as it is called in the blurb on the cover. Much of the hard-hitting seems unfortunately to be below the belt, and the technical qualifications of the writers, who are stated to be engineers, seem to be more pronounced in the art of sensationalism than in the sciences of chemistry, biology, medicine, and public health.

The impression created by this book is that all fruits and vegetables are dosed with arsenic and lead, and all dried fruits with sulphur dioxide, that all bakery products and meats are bleached or preserved with dangerous chemicals, that most milk comes from tuberculous cattle, that all food and drug manufacturers are mercenary and dishonest, that all advertising agencies are unethical if they are not liars, that the Federal Food and Drug Administration is incompetent, and the law under which it operates is ineffective. This is a conservative statement of some of the immoderate charges with which the book is replete.

Mixed with these many intemperate and exaggerated assertions is some really valuable material on certain arrant quackeries. The chapters on cosmetics, on prescriptions and poison, and on fakes and frauds generally, are sound and sensible, although characteristically rabid. Many of the data are taken from the *Journal of the American Medical Association,* the advertising pages of which are, nevertheless, caustically criticised for their alleged inconsistencies and impurities.

The Federal Food and Drugs Act may be full of defects as the authors declare, but the remedies they so blandly propose are likewise neither practical nor constitutional. Among their weird suggestions is that the enforcement of an improved food and drugs act be transferred to a new Department of Public Health and Education, because "production and financial interests" dominate the present administration and also the Public Health Service.

Such a charge is fatuous, as anyone with the brains of three real guinea pigs who has dealt with these agencies and worked with them will appreciate. The constantly recurring strictures in this book on the motives of the Federal Food and Drug Administration and the innuendoes regarding the efficiency and

honesty of its officials are grossly unfair and unwarranted.

Like much of the material that emanates from Consumers Research, Inc., this book is interesting, entertaining, and somewhat instructive, but extremely unreliable. It represents a vast amount of research, much of which could have been utilized to better advantage. It presents some valuable facts which may help to jar the public out of its customary complacent attitude toward quacks and charlatans, but too many of the data are fantastically exploited and erroneously interpreted. Probably for that reason the book is already more or less of a best seller. Sanitarians may enjoy reading it, provided they do so with an open mind.

JAMES A. TOBEY

Health Stories, Book One—*By Anna B. Towse and William S. Gray. Chicago: Scott, Foresman and Co.*, 1933. 144 pp. Price, $.60.

What with the mauling teachers are receiving in many quarters, this is, first of all, a cheerful looking book. That is something very important these days. The 97 pictures are the more attractive through the generous use of colors. There are birds, dogs, ducks, and flowers which the children love and pictures also of occasional vegetables which they do not always like so much. Even the child stamping through the rain on page 50 is smiling under his umbrella. These pictures have a lilt about them which is in keeping with the cheerful presentation of the subject matter.

This book is a supplementary reader plus, and is intended for first grade children. It is part of the Curriculum Foundation Series. The 489 words comprising the vocabulary used have been screened in accordance with a yard-stick called the Elson Basic Primer. The authors have tied together specialized vocabulary and specialized skills, both simple, and both attractive. There is no confusion of ideas, nor has any effort been made to present too many of them at the risk of bulging the child's head. The subject matter used is nicely arranged to fall within reach of the first grader's understanding, appreciation, and practice.

If the present scheme of things demands more work of teachers at less pay, then at least teaching instruments should be kept sharp. The material in this book is so organized as to facilitate its use. There are five units—each one on how to do something; keep clean, care for yourself, grow strong and healthy, keep well, and keep out of danger. Once it is placed in their hands, I suspect many children will request the privilege of taking the book home to show father and mother.

W. W. PETER

The Fine Art of Living—*By Daniel S. Sager, M.D. Philadelphia: Dorrance*, 1932, 215 pp. Price, $2.00.

This book is written in simple, popular style for the average lay reader. It treats of the general subject of Personal Hygiene in a simple and elementary manner. Twenty-one of the 35 chapters are devoted to various phases of the nutrition problem including brief mention of vitamins and the place of such foods as eggs, meat, fruit, nuts, cereals, vegetables, sugar, and milk in the diet. Other chapters deal with breathing, bathing, outdoor life, the nature of disease, indigestion, constipation, appendicitis, and long life. Several chapters are one or two pages in length and the average chapter length is about six pages.

The book is without illustrations. It contains no new information for the professional worker. It does not prescribe drugs although it suggests home remedies and hygienic procedures for such conditions as constipation, appendicitis, and overweight. Individuals

would doubtless differ with the author on minor points but the book in general presents commonly accepted facts of hygiene in a simple and readable manner. C. E. TURNER

Popular Science Talks—*Philadelphia College of Pharmacy and Science,* 1932. 319 pp. Price, $1.00.

For several years this Philadelphia institution has collected in one volume the popular science essays given by the college faculty during the preceding season. Although health topics form but a small part of the many fields explored, many of the other subjects are closely related, like physiology and chemistry. The sanitarian will find much of practical value in many and much of interest in all of the dissertations.

Judging from the current number, a library of the complete 8 volumes would give the health worker a readily utilizable source of material for preparations in the many fields of learning in which he is supposed to have ideas. Only a veritable walking encyclopedia of science could pass judgment upon the validity of such a diverse collection of treatises. But one can testify to their readableness and interest.

R. S. PATTERSON

Microscopic Slide Precipitation Tests for the Diagnosis and Exclusion of Syphilis—*By B. S. Kline. Baltimore: Williams & Wilkins,* 1932. 99 pp. Price, $2.50.

The technical procedures are very adequately presented. Care has been exercised to provide detailed directions which will be welcomed by those wishing to obtain results entirely comparable to those of the author. The means for securing uniformity of the physical state of the diluted antigen is of particular interest.

Some of the tabulations might have been improved had sufficient blood been collected in all instances to permit the entire series of tests to be made with each specimen.

In addition to the microscopic slide test, a method for a macroscopic procedure is described in which the precipitate collects in the form of a globular mass thus permitting the results to be very easily determined. The use of the centrifuge to hasten the reaction is a distinct contribution.

The conclusions drawn from the comparison of the complement-fixation and precipitation tests performed with the same antigen are open to question since the type of antigen which may furnish optimum results with one of these forms of technic may be entirely unsuitable for the other.

RUTH GILBERT

Correction of Defective Speech—A Complete Manual of Psycho-Physiological Technique for the Treatment and Correction of the Defects of Speech—*By E. B. Twitmeyer, Ph.D., and Y. S. Nathanson, Ph.D. Philadelphia: Blakiston,* 1932. 413 pp. Price, $3.50.

The authors present a "technique for the correction of all types of speech mutilations" without making any claims in defense of a specific theory. Nevertheless they find a "common factor" which is present in most of their cases: "a disturbance of the normal rhythm of breathing, not only of the costal and diaphragmatic excursions, but also as these, in turn, are synchronized with the modulating adjustments, of the peripheral organs of speech." They emphasize: (a) correct breathing exercises, (b) correct kinaesthetic imagery (oral positions), (c) combinations of (a) and (b) in speech output. The corrective material is arranged so that "no new sound appears in the exercises until the teaching and learning of the previous sound has been acquired." There are distinct

gaps in the evaluation of personality functions and of the total situation in which certain disorders of speech arise.

No attempt has been made to classify speech defects or to describe what constitutes a specific disorder of speech. The etiological topics (Deafness, Amentia, Brain Injury, Anatomical Anomalies of the Organs of Speech, Negativism—"pathological stubbornness") are dismissed with bare descriptive references.

The greater part of the book is composed of carefully selected exercises which are directed toward body coördination, breathing, vocalization, and includes corrective material for the peripheral organs of speech, articulation and integrated speech. An addendum contains suggestions for the treatment of "imitatory acts" by means of a scoring system which is kept by the patient. Here also the personality factors and total situation are minimized in the attempt to lift the act into the field of "volitional performance."

The book is essentially a manual of defective speech training and as such can be recommended for its suggestions as to technic and its excellent collection and arrangement of corrective material.

JACOB H. CONN

Poliomyelitis—*Survey by The International Committee for the Study of Infantile Paralysis. Baltimore: Williams & Wilkins,* 1932. 562 pp. Price, $6.00.

The International Committee for the Study of Infantile Paralysis organized by Jeremiah Milbank has summarized the available knowledge and the results of its own investigations in book form. The organization of the material has been performed excellently so that the subject matter presents the disease as a whole. It is divided into chapters concerned with the history, etiology, resistance and immunity, symptomatology, treatment, pathology, and epidemiology, each of which is extremely well written. There are an extensive well-keyed bibliography and a detailed index. Poliomyelitis is really summarized in this work which is highly recommended.

EDWIN O. JORDAN

Nutrition Service in the Field—Child Health Centers: A Survey—*Report IC of the Committee on Medical Care for Children of the White House Conference on Child Health and Protection. New York: Century,* 1932. 196 pp. Price, $2.00.

Two reports on Child Health and Protection are included in this volume. The first section of the book presents the findings and recommendations of the Sub-committee on Nutrition, of which Lucy H. Gillett was chairman. The place, qualifications, and training of the nutritionist in the field of child health are defined clearly. Her services are summarized under the following heads: (1) Promotion and general educational work in the community. (2) Organization and executive work. (3) Instruction, supervision, and consultation—interpreting scientific facts. (4) Direct service—advisory service for individuals and families in connection with nutrition and budget problems. (5) Research—planning and conducting research in the field. Examples of outstanding nutrition services in national, state, and local communities are described, and a section is given to nutrition work in hospitals and dental infirmaries.

The second part of the book is devoted to the report of the Sub-committee on Health Centers, which was presented to the Conference by Dr. J. H. Mason Knox. It is replete with interesting information based upon an extensive study of child health centers throughout the United States and its possessions.

The report defines a health center as "a place where infants and children are examined and parents or guardians given such advice as will promote and protect the health of their children. The service in a typical center is preventive and does not include the treatment of disease." The geographical distribution of 1,511 health centers with the source of support is given in tabular form. The nature and scope of the centers are indicated.

An excellent summary with recommendations is included. The appendix contains a copy of the questionnaire, an analysis of the centers receiving white and negro children, and health centers in Hawaii, Porto Rico, Alaska, and the Philippines. RICHARD A. BOLT

Endocrine Medicine — *By William Engelbach, M.D. Foreword by Lewellys F. Barker. Three volumes and an index volume. Springfield, Ill.: Thomas,* 1932. Price, $35.00.

This treatise comprises the results of Dr. Engelbach's observations during his life as a teacher and investigator. While a great deal is naturally the result of the investigations and clinical findings of a host of others, yet he has so woven his own observations in with these, that as a result, we have the most instructive system of endocrinology published in recent years. Certainly nothing of its magnitude has been attempted since *Endocrinology and Metabolism,* by Barker, Mosenthal, and Hoskins, appeared in 1922.

In Volume I, the author discusses briefly the history of this branch of internal medicine, followed at considerable length by the organology and the physiology of the endocrine system. Following this come etiology, diagnostic procedures, and the relationship of endocrinology to general medicine and the several specialties. Lastly, there is a discussion of the relationship of endocrine disorders to public health. In writing of the relationship of endocrinology to general medicine, it is pointed out that there are few of the various systems in the body that are not affected in some way by this system of glands.

While the treatment of the public health aspects of endocrinology is all too brief, the point is made most emphatically that much can be done by everyone in the several branches of medicine, especially by the general practitioner, to prevent the economic waste and human sorrow due to endocrine disturbances. At a very conservative estimate, the condition of 782,000 of the 10,000,000 defective children in the United States is due directly to endocrinisms, and to a certain extent, these disorders play a part in other forms of defectiveness. From this standpoint the appalling cost of this condition to the taxpayer is emphasized.

In few instances in works of this kind, outside of books devoted to psychiatry and child guidance, does one find such a frank recognition by the author of the bearing of endocrine imbalance upon the social reaction of the child. This brings in its wake the many problems of maladjustment, incorrigibility, crime, and other types of social ills. Special emphasis is here placed upon the need for more careful prenatal and postnatal care from the endocrinological aspect so that these defects may not all be transmitted to succeeding generations.

Volumes II and III are devoted to the consideration of the clinical aspects of endocrine dyscrasias in the infant, the child, the adolescent, and the adult respectively. Here the author makes free use of numerous pictures, tables, charts, and case histories to clarify the subject matter of the text. Of special interest are the excellent anthropometric tables which the author has worked out for the tabulation of growth abnormalities.

It would seem that the subject has been treated in quite a voluminous manner. Such, however, is not the case. No doubt much more could be written which would be helpful, yet the exposition of the subject is excellent.

Certainly no recent work upon the subject of endocrinology has given the medical profession such a complete review as has this work. Free use is made of experimental physiology to help clarify this most complicated subject. For this reason, it should appeal to the clinician as well as to the worker in pure science. While the discoveries of the future may modify or change certain concepts, yet the attitude of the author is that of one trying to base his opinions upon facts proven in the laboratory, instead of indulging in hypothetical conjecture.

If any criticism is to be offered, it would seem that too little attention has been given to the subject of the suprarenal and its diseases, especially in view of the recent work done upon this gland.

The physical make-up of these volumes is excellent, the printing easily legible, and the illustrations profuse and adequately illustrative of the various endocrinopathies.

EDGAR D. BASKETT

International Health Year-Book, 1930, Vol. VI—*League of Nations, Geneva, 1932. Available in the United States only through the World Peace Foundation, 40 Mount Vernon Street, Boston, Mass.* 1100 pp. Price, $6.00.

This sound and thorough report upon the status of the world's health during the year 1930 presents a record of outstanding value for the use of reference libraries and for statistical and administrative departments of public health agencies and organizations. The statistical section gives data for each country on population, births, mortality, causes of death, infant mortality, and special information which may be available in individual countries reflecting health status in some particular field. A second section of the report for each country describes the campaign against those acute and chronic diseases which are receiving most attention from public health authorities in the country in question.

Each country reports also upon its activities in the field of social medicine and public health, presenting a description of activities of special interest in relation to such topics as Maternity and Infancy, Health Conferences, Training of Personnel, Demonstrations, Sanitation, School Health, Health Education, and Industrial Hygiene. Some countries report upon hospital, sanitary, and other activities in the field of curative medicine. All report upon public health legislation and the budget. The tables are well organized and systematized. The factual material is carefully selected, and clearly stated.

The countries covered in the report are Australia, Belgium, Bulgaria, Chinese Republic, Czechoslovakia, Denmark, Egypt, Estonia, Finland, France (including French Colonies), Germany, Greece, Hungary, Irish Free State, Italian Colonies, Japan, Latvia, Lithuania, Mexico, The Netherlands, New Zealand, Norway, Poland, Spain, Sweden, Switzerland, Turkish Republic, Union of Soviet Socialist Republics, United Kingdom (England and Wales, Scotland, Northern Ireland), United States of North America, Yugoslavia.

C. E. TURNER

Cancer Then and Now—*New York City Cancer Committee,* 1932. 80 pp. Price, $1.00.

An interesting and informative pictorial exhibit on cancer was prepared in 1931 by the energetic New York City Cancer Committee. The material, consisting of charts and photographs

depicting the development of our knowledge of cancer, has been assembled in this attractively printed pamphlet. Each chart has been supplemented with a brief essay on some aspect of cancer control, prepared by an authority in the particular field. While less complete than recent popular texts on cancer, this excellent pamphlet will prove to be invaluable to any person concerned with the prevention and cure of malignant diseases, and it will be of general interest to health educators. JAMES A. TOBEY

Your Hearing: How to Preserve and Aid It—*By Wendell C. Phillips, M.D., and Hugh Grant Rowell, M.D. New York: Appleton,* 1933. 232 pp. Price, $2.00.

This is an excellent book, informative and instructive to the deaf, to physicians, especially those in school work, to the social worker, the psychologist, and the layman in general. The style is never stilted nor confusing; the presentation of the various problems is scholarly and could well be imitated in treatises of a strictly medical nature.

There is given a view of the wide extent of deafness, estimated at 3,000,000 school children and 17,000,000 adults. Full discussion follows of the causes of deaf-mutism and the usual degrees of deafness. The hearing apparatus, its anatomy and functions are illustrated and explained. A very complete description of methods for testing hearing, especially the various forms of electrical audiometers, is given, with an explanation of their use and value in different cases. Next is a discussion of the types and classifications of deafness, and an honest statement of the ability and limitations of the physician in treatment is given. Then comes an important chapter on the care of one's own ears with advice, and warning of the dangers of self-treatment. Of particular interest are the pages on the dangers of bathing, diving, polluted waters, colds, and contagious diseases.

In the chapter on education of the hard of hearing, special stress is laid on the concept that they are to be regarded as mentally normal, and, for psychological and pedagogical reasons and results, should be educated not alone, but with other children.

Good description and history of lip-reading, its applications and values, gives an insight into this method of approach. Particularly important is a full discussion of possible resultant mental abnormalities, their recognition and adjustment by proper and experienced employment agencies, and modern programs of conservation of hearing. Of interest and value to the industrial worker are the chapters on the hazards in the metal, textile, transport, and building industries, regulations against hazards, and lists of favorable trades for the deaf. A chapter deals also with the problems of home and marriage. Especially instructive are chapters on the mechanical and electrical apparatuses that may aid the deaf, which give tests to safeguard the purchaser against improper choice, and warn against the quackery of playing on the hopes and ignorance of the deaf. JEROME MEYERS

Hookworm Infection—*By Clayton Lane, M.D. London: Oxford University Press,* 1932. 319 pp. Price, $6.25.

This work is a monument to one who has done extensive personal investigation in a peculiar field of medical science. The author is to be commended for his distinctness and clearness of expression. The homely comparisons vividly deliver pointed facts to the reader. The chapter on diagnosis is particularly comprehensive, of practical value to the clinician and records much personal research. The author's

investigational records may well stand as a guide to the scientific control of tests and technic. The contents of the entire volume should be familiar to every hygienist, and the chapter on prevention should be made known to landlords, mine operators, property owners, renters, landworkers, agriculturists, and all others responsible for the proper disposal of feces, and the tenets prescribed be rigidly enforced.

While the author lists and describes infection in man occurring by mouth, it is peculiar that in the chapter on prevention he does not discuss the means of guarding against this. To the reviewer there are two outstanding sources of such oral infection—that of the clay eater, and that of the consumption of raw vegetables and soil contaminated raw fruits—both of which may become infectious by night soil, natural privies, or dissemination from other unsatisfactory privies.

The book carries an extensive bibliography; and its contents are well grouped under distinctive headings and sub-topic headings.

M. PINSON NEAL

How to Budget Health—*By Evans Clark. New York: Harper,* 1933. 328 pp. Price, $4.00.

Here is the specific proposal toward which the accumulating volumes of research have been pushing us. Evans Clark with the practical urge of the Twentieth Century Fund behind him has summarized and interpreted the reports of the Committee on the Costs of Medical Care, and then pictured the application of the major recommendations in terms of persons and services and dollars.

In the 15 chapters and helpful appendices the author has concentrated an abundance of sound sociology and economics. Of course he does not propose a health budget, and he uses the term " guild " in a way that varies from the connotation of the ancient professional and trade guilds of Europe, but he does create a trustworthy background of fact, quoted largely from the publications of the Committee on the Costs of Medical Care, and then he leads the reader through the common experience of haphazard payment, and uncertainty of quality of medical care today, to look with some hope and ambition toward a better medical responsibility and a more reliable basis of payment by patients.

Evans Clark proposes the creation of groups of physicians associated for service through the facilities of a hospital of the community used in common by them, to offer to groups of potential patients of the local population all necessary medical treatment and diagnosis for preventive care as well, at an agreed annual or monthly fee on the basis of voluntary insurance without the intervention of government dominance or of commercial exploitation.

Between no other covers can one find in so small a compass so useful and stimulating a proposal, certain to be pondered seriously by both doctor and patient, that is, by all of us.

HAVEN EMERSON

Books for Tired Eyes—*(2d ed.) Compiled by Charlotte Matson. Chicago: American Library Association,* 1931. 59 pp. Price, $.50.

This brief volume presents a listing of books printed in 14-point type, got up especially for those who find smaller type fatiguing. The list includes topics under the following headings: Fiction; Biography; Travel, Adventure and Out-of-Doors; Literature; History; Books of General Interest; Books for Young People. Also included is the Clear Type Series—books printed in 24-point type which are in general use in sight-saving classes, where only the most legible of type can be utilized.

ISOBEL JANOWICH

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

High Calcium, High Vitamin Diet—"The average American dietary is poor in calcium content. . . . Without milk or cheese in the diet it is difficult to obtain the needed calcium through food alone. Utilization of calcium is ineffectual, even with a sufficient calcium intake, unless the factors that control the absorption of calcium are also adequate."

BERNHEIM, A. R. Calcium Need and Calcium Utilization. J.A.M.A. 100, 13:1001 (Apr. 1), 1933.

Colds Lead Them All—A country-wide sample of 8,000 odd families surveyed for a year gave a sickness rate of 850 per 1,000. Many important findings are recorded in this valuable research which confirms in the main the more limited sampling of the Hagerstown studies.

COLLINS, S. D. Causes of Illness in 9,000 Families, Based on Nation-wide Periodic Canvasses 1928–1931. Pub. Health Rep. 48, 12:283 (Mar. 24), 1933.

Bran as a Source of Fibrous Roughage—A good word is said for the laxative value of bran by one who was numbered among the doubters. Except in cases of ulcerated or highly irritable colon, the authors feel now that bran is indicated in constipation. In many cases a diet high in green and fibrous vegetables is not sufficient.

COWGILL, G. R. and SULLIVAN, A. J. Further Studies on the Use of Wheat Bran as a Laxative. J.A.M.A. 100, 11:795 (Mar. 18), 1933.

Group Medical Services Grow—This month the Welkin rings with discussions of social medicine. This paper is a valuable contribution as a record of successful ventures in group hospitalization and medical practice.

DAVIS, M. M. Organized Action in Medical Care. Survey Graphic 22, 4:207 (Apr.), 1933.

The Hague's Refuse Disposal—How the streets are kept clean in that country we think of as the acme of cleanliness is interestingly told. Slovenly American communities will think it an unattainable counsel of perfection.

DEGROOT, V. Street Sanitation in Holland. Municipal San. 4, 3:86 (Mar.), 1933.

The Decline and Fall of Diphtheria—The record of deaths from diphtheria in England from 1881 to 1931 is presented, together with case reports, for the edification of those who may care to compare experience here and there. They will derive comfort from the comparisons.

FORBES, J. G. A Survey of Diphtheria in England and Wales. J. State Med. 41, 3:131 (Mar.), 1933.

Potency of Toxoid Varies—Apparently all diphtheria toxoid is not equally potent. The author found one product distinctly inferior to four others in a comparative test. This is a subject into which health officials would do well to inquire.

GREENGARD, J. The Effectiveness of Commercial Diphtheria Toxoid in Active Immunization of Infants. J.A.M.A. 100, 11:793 (Mar. 18), 1933.

Air in Home and School—The author tells in minute detail how he keeps his residence at a temperature of 62° to 64° F., adding radiant heat to rooms only when, and as, occupied. Over a 10-year period the sickness record of his large family living under these conditions has been good. An interesting contrast between factors in

the adequate ventilation of home and school is presented.

HAYHURST, E. R. Air-Conditioning With Relation to Comfort, Health and Efficiency. J. Indust. Hyg. 15, 2:98 (Mar.), 1933.

Eating for Healthy Teeth—Another summary of the rôle of diet in preventing decay of the teeth; a story which cannot be too often retold as long as the "clean tooth" fallacy returns to haunt its guilty perpetrators.

LYONS, D. C. Diet and Decay of Teeth. Am. J. Nurs. 33, 3:203 (Mar.), 1933.

Smallpox—Old Style—What hemorrhagic smallpox can do when it pops up in an unvaccinated community is told in this symposium on a recent Canadian outbreak with 56 recorded cases and 17 deaths—a fatality rate of 30 per cent.

MCINTOSH, J. W., *et al.* The Vancouver Outbreak of Hemorrhagic Smallpox. Canad. Pub. Health J. 24, 3:105 (Mar.), 1933.

The Insidious Menace (?) of Public Health to Private Medicine—The Sage of Baltimore takes a pot-shot at the recommendations of the Committee on Costs of Medical Care in true Menckenian fashion with gratuitous gibes at the reprehensible proclivities of health workers who offer demoralizing social services to all and sundry. Whether you are infuriated or amused, you will find the article good for the soul.

MENCKEN, H. L. What's Going On in the World. Am. Mercury 28, 3:257 (Mar.), 1933.

When Crude Death Rates Lie—"A man dies of influenzal pneumonia; at autopsy a very early cancer of the kidney is found; this death will be recorded . . . as being caused by cancer." "If diabetes is mentioned, even as a secondary cause . . . diabetes will get the credit." These are two reasons why statistics do not mean what they seem to mean.

MILLER, J. R. Do Official Death Rates for Diabetes, Cancer and the Puerperal State Accurately Reflect Present Conditions? New Eng. J. Med. 208, 9:490 (Mar. 2), 1933.

Tuberculosis Prevention Surveyed—This is a general review of the modern developments in tuberculosis control presented to a university group in readily understood words, though it could hardly be designated a popular summary.

MYERS, J. A. Recent Developments in Our Knowledge of Tuberculosis. Am. Rev. Tuberc. 27, 2:121 (Feb.), 1933.

When Do Children Grow?—Maximum increase in weight occurs in the fall, less in the winter and least in the spring. During 8th and 9th years boys grow a little faster than girls, but in the 10th year girls put on speed until the 14th when boys again forge ahead. Other worth-while observations are recorded.

PALMER, C. E. Seasonal Variation of Average Growth in Weight of Elementary School Children. Pub. Health Rep. 48, 9:211 (Mar. 3), 1933.

Preventable Causes of Maternal Deaths—This article on what's wrong with maternal hygiene administration has some far reaching implications. For instance, "It is an incontrovertible fact that certain discoverable functional defects render a woman unfit for pregnancy or delivery. . . . To know the danger and to refuse to protect her from it is to practise, not enlightened medicine, but ancient or medieval philosophy, on the altars of which every year certain women are sacrificed." The paper is reprinted in the current issue of the *Medical Officer*, 49, 10 (Mar.), 1933.

ROCK, J. Maternal Mortality. The Commonhealth (Mass.) 19, 4:171 (Oct.-Dec.), 1932.

A Savage Rejoinder to Pasteurization Opponents—"There is nothing in any of these experiments to indicate that any unknown substance is de-

stroyed by pasteurization. All the results (such as they are) are explainable on a diminution of calcium and phosphorus fed to experimental animals whose need of these substances is much greater than man. They offer no evidence which can be applied to man." The remainder of the paper discussing the practical bearing of pasteurization upon child nutrition appears in the succeeding issue.

SAVAGE, W. G. The Effect of Pasteurization Upon the Nutritive Properties of Milk. Lancet, 224, 5713:429 (Feb. 25), 1933.

Potent Arguments Against Socialized Medicine—An effective, convincing presentation of the arguments against the proposals of the Committee on Costs of Medical Care, avoiding all the invective and billingsgate that have marred so much of the discussion by the opponents of the majority schemes. It should be read critically and conscientiously by all health workers.

SCHWITALLA, A. M. Basic Considerations in Minority Report of Committee on Costs of Medical Care. J.A.M.A. 100, 12:863 (Mar. 25), 1933.

BOOKS RECEIVED

HEALTH ORGANIZATION. Enquiry into the Quinine Requirements of Malarial Countries and the World Prevalence of Malaria. League of Nations. Boston: World Peace Foundation, 1932. 89 pp. Price, $.75.

AMERICAN AND CANADIAN HOSPITALS. Edited by James Clark Fifield. Minneapolis: Midwest Publishers Company, 1933. 1560 pp. Price, $10.00.

THE COSTS OF MEDICAL CARE. By I. S. Falk, C. Rufus Rorem and Martha D. Ring. Chicago: University of Chicago Press, 1933. 623 pp. Price, $4.00.

THE INCIDENCE OF ILLNESS AND THE RECEIPT AND COSTS OF MEDICAL CARE AMONG REPRESENTATIVE FAMILIES. By I. S. Falk, Margaret C. Klem, and Nathan Sinai. Chicago: University of Chicago Press, 1933. 327 pp. Price, $3.00.

THE ABILITY TO PAY FOR MEDICAL CARE. By Louis S. Reed. Chicago: University of Chicago Press, 1933. 107 pp. Price, $2.00.

MEDICAL BIOLOGY. By William B. Sharp. Galveston: Author, 1933. 443 pp. Price, $4.50.

IMPROVISED EQUIPMENT IN THE HOME CARE OF THE SICK. 2d ed. By Lyla M. Olson. Philadelphia: Saunders, 1933. 197 pp. Price, $1.25.

THE RISE OF PREVENTIVE MEDICINE. By Sir George Newman. New York: Oxford Press, 1932. 270 pp. Price, $3.00.

THE GIRLS' CAMP. By Abbie Graham. New York: Womans Press, 1933. 146 pp. Price, $1.50.

AMERICAN RED CROSS FIRST AID TEXT-BOOK. Philadelphia: Blakiston, 1933. 237 pp. Price, $.60 Paper and $1.00 Cloth.

NEWS FROM THE FIELD

SUMMER SCHOOL COURSES IN PUBLIC HEALTH

While the following list does not show all universities and technical schools offering summer courses in public health, it represents those who have replied to a questionnaire sent out by the American Public Health Association.

American National Red Cross

Courses in Teacher Training for Home Hygiene Instructors:

University of California, Los Angeles, Calif.—June 28–August 9
Colorado Agricultural College, Fort Collins, Colo.—July 10–August 19
Pennsylvania State College, State College, Pa.—July 3–August 11
Syracuse University, Syracuse, N. Y.—July 5–August 12

The National Society for the Prevention of Blindness

Courses to prepare teachers for the education of children with seriously defective vision:

University College, University of Chicago, Chicago, Ill.—June 26–August 1
Teachers College, Columbia University, New York, N. Y.—July 10–August 18
Western Reserve University, Cleveland, O.—June 19–July 28

University of California, Berkeley, Calif.

June 26–August 4

Elementary Epidemiology
Elementary Public Health
Management of the Hospital Unit
Supervision in Hospitals and Schools of Nursing

University of Chicago, Chicago, Ill.

June 19–August 25
First Term: June 19–July 21
Second Term: July 24–August 25

Teaching the Principles and Practices of Nursing
Supervision in Schools of Nursing
Ward Management and Teaching
General Bacteriology
Advanced Bacteriology, Parasitology, and Public Health
Special Public Health Problems
Preventive Medicine and Immunology
Introduction to Nutrition
Nutrition
Clinical Nutrition
Seminar in Food and Nutrition
Child Care
Child Development and Training

Columbia University—DeLamar Institute of Public Health, College of Physicians and Surgeons, New York, N. Y.

June 12–30

School Health Supervision—Medical Inspection, Mental Hygiene, and Physical Education

Teachers College, New York, N. Y.

July 10–August 18

Administration of Health Work in Schools
Child Hygiene
Health Education in Elementary Schools
Health Problems in the Teaching of Fresh Air Classes
Home and Community Hygiene
Methods of Teaching Lip-Reading
Nutrition and Health
Personal Hygiene
Principles of Public Health Nursing
Public Health Administration
Safety Education
School Nursing
Sight Saving Classes
Supervision in Public Health Nursing
Supervision of Health Education
Survey of Public Health Nursing

Health Education in Nursing Schools
Health Care of Children
Principles of Health Education
Health Examination
Tests and Measurements in Health and Physical Education
Administration of Health Education in Public Schools
Administration of Health and Physical Education in Teacher Training Institutions

Cornell University, Ithaca, N. Y.
July 10–August 18

Gymnastics and Dancing
Health Supervision of School Children
Hygiene of the School Child and Adolescent
Measurements of School Children
Physical Education
Principles of Health Education

Duke University, Durham, N. C.
June 9–July 20, 21–August 31

Materials and Methods in Health Education
Materials and Methods of Physical Education
Personal and School Hygiene

University of Georgia, Athens, Ga.
June 13–August 13.

Child Care and Training
Child Study and Parent Education
Diagnosis and Treatment of Exceptional Children
Educational and Mental Hygiene
Physiology and Health
Principles of Health and Recreation
The Age of Adolescence
The Age of Childhood
Nursing School Rural Sociology

University of Hawaii, Honolulu, T. H.
June 26–August 4

Principles of Health Education and School Hygiene

University of Illinois, Urbana, Ill.
June 19–August 12

Physical Education
School Program of Physical Education
Training Theory
Health Education and Corrective Gymnastics
Physical Education Program for Elementary Schools
Mental Hygiene in the School
Methods of Teaching Health
Mass Physical Activities

Johns Hopkins University, Baltimore, Md.
June 26–August 5

Subject Matter of Health Education—Personal Hygiene
Subject Matter of Health Education—Public Hygiene

Massachusetts Institute of Technology, Cambridge, Mass.

Bacteriology—July 5–August 11
Health Education Methods—July 5–25

Michigan State College, East Lansing, Mich.
June 19–July 28

Bacteriology
Health Education Matters
Hygiene
Medical Biology
Pathology
Physiology

University of Michigan, Ann Arbor, Mich.
June 26–August 4

General Hygiene and Public Health
The Mental Hygiene of Adolescence
Child Hygiene
School Health Problems
Methods and Materials in Health Teaching
Principles of Public Health Nursing
Administration and Organization of Public Health Nursing
Applied Nutrition
Applied Hygiene and Public Health
Public Health Statistics
Public Health Law and Administration
Rural Hygiene
Industrial Hygiene
Race Hygiene
Epidemiology and Communicable Diseases
Public Health Laboratory Methods
Public Health Institute

University of Minnesota, Minneapolis, Minn.
June 19–July 29

Public Health

University of Missouri, Columbia, Mo.
June 12–August 4

Nursing
Physical Education
School Hygiene

University of New Mexico, Albuquerque, N. M.
June 5–July 29
Educational Hygiene

New York University, New York, N. Y.
July 7–August 16
Teaching for Health
Child Hygiene
Administration and Supervision of the Health-Education Program
Health and Growth of School Children

Rutgers University, New Brunswick, N. J.
June 26–August 4
First Aid
Preventive Medicine
Public Health

Stanford University, Stanford University, Calif.
June 23–September 3
Physical Education and Hygiene

Syracuse University, Syracuse, N. Y.
July 5–August 11
Public Health Nursing
Methods in Teaching Home Hygiene Courses

Vassar College, Poughkeepsie, N. Y.
June 28–August 9
Institute of Euthenics
Child Psychology
Adolescent Psychology
Course for Nursery School Teachers
Mental Hygiene
Physiology and Nutrition
Household Technology
Food Selection, Preparation, and Service
Problems of the Modern Family
Parent Education Leadership

University of Virginia, University, Va.
June 20–July 30 (First Term)
August 1–September 3 (Second Term)
Biochemistry
Hygiene and Sanitation
Physical Education
Sex Character Education

Washington University, St. Louis, Mo.
June 16–July 28
Sociology and Social Work
Education
Family Health
Psychology
Nursing
Public Speaking
Principles of Public Health Nursing

University of Washington, Seattle, Wash.
June 14–July 21 (First Term)
July 24–August 24 (Second Term)
Advanced Nutrition
Bacteriology
Physical Education Methods
Principles of Physical Education
Introduction to Public Health Nursing
Principles of Public Health Nursing
School Hygiene
Supervision in Physical Education
Principles in Health Education
Organization and Administration of Physical Education

University of West Virginia, Morgantown, W. Va.
June 12–July 21
Playground and Community Recreation
Public School Health
Principles of Physical Education
Problems in Physical Education

Western Reserve University, Cleveland, O.
June 19–July 28
Theory and Practice of Nutrition
Foods
Personal Hygiene
The Teacher's Relation to the Community
Public Health Nursing
Health Education for the Elementary School
Dietetics

University of Wisconsin, Madison, Wis.
June 26–August 4
Bacteriology
First Aid to the Injured
Supervision and Administration of School Health
Tests and Measurements in Physical Education
Health Education in Schools

GERMS NOT KILLED BY LIQUID HELIUM

EXTREMELY low temperatures, approaching those believed to exist in interstellar space, failed to kill bacteria in tests at the University of Toronto. Germs frozen for weeks in liquid helium, at a temperature of about 450 degree below zero Fahrenheit, proved to be alive and able to multiply as though nothing had happened to them, as soon as they were thawed out.

These results are taken as indicating at least the possibility of the lower forms of life migrating through space, perhaps attached to bits of dust. They are of more immediate practical value as demonstrations of the fact that though cold will preserve foodstuffs it will not kill the germs of decay that lurk on them.

The experiments were performed by Dr. J. O. Wilhelm, physicist, Dr. H. Wastenays, biochemist, and Dr. W. L. Holman, bacteriologist.—*Science News Letter*, Feb. 11, 1933.

HOOKWORM SURVEY

THE examinations in 8 counties in Mississippi have been completed in a hookworm survey carried on by the Mississippi State Board of Health in coöperation with the department of preventive medicine of the Vanderbilt University School of Medicine, and the International Health Division of the Rockefeller Foundation. The survey was begun September 1, 1932. Twenty per cent of the 8,363 specimens examined showed the presence of hookworm ova. Of those found positive, there was an average of 135 worms per person. Thus far, the results of the survey indicate that intensive parasites are a problem of only the white race, the report stated. Negroes showed less than 2 per cent positive for hookworm ova.—*J.A.M.A.*, Mar. 11, 1933, p. 748.

PERSONALS

DR. ELDRED V. THIEHOFF, a member of the A.P.H.A., has been appointed Acting Director of the Cleveland Child Health Association in the absence of Dr. Richard A. Bolt, who has been granted an award by the Oberlaender Trust for a year's study abroad. Dr. Thiehoff was formerly Chief of the Child Hygiene Service of the Akron City Health Department.

DR. R. E. DYER, of the U.S.P.H.S., was chosen by the Association of Military Surgeons of the United States to deliver the lecture at the Kober Day celebration in Washington, March 28. His subject was "Typhus and Rocky Mountain Spotted Fever."

DR. DANIEL M. BRADLEY, of Waycross, Ga., has been elected Commissioner of Health of Ware County.

DR. WEBB CONN, of Brunswick, Ga., has been elected Health Commissioner of Glynn County.

DR. JAMES ANGUS DOULL, F.A.P.H.A., of the Western Reserve University School of Medicine, Cleveland, sailed March 25 for the Philippine Islands to organize an epidemiologic study for the eradication of leprosy.

DR. SAMUEL MCC. HAMILL, of Philadelphia, member A.P.H.A., has been appointed by Governor Pinchot to the office of Chairman of the Pennsylvania Emergency Child Health Committee to supplement the work of relief organizations, with special emphasis on nutrition.

DR. CHARLES A. NEAFIE, member A.P.H.A., of Pontiac, Mich., has been appointed associate director of health of the State of Maine. Dr. Hubert M. Heitsch, F.A.P.H.A., succeeds Dr. Neafie as director of the Pontiac Health Department, it is reported.

DR. EUGENE P. KING, second deputy superintendent of health of Providence, R. I., has announced his retirement. Dr. King has been connected with the department for over 40 years.

DR. W. T. HENSHAW, F.A.P.H.A., of Charleston, has resigned as State Health Commissioner of West Virginia.

DR. DAVID LITTLEJOHN, F.A.P.H.A., of Charleston, has been appointed as Acting Health Commissioner of West Virginia, in place of Dr. W. T. Henshaw, resigned.

DR. HUGH C. MCREE, for years head of the Morgan County Health Unit, has been appointed Health Officer of Lee County, with headquarters at Opelika, Ala.

DR. GEORGE L. THOMPSON, of Owensboro, Ky., member A.P.H.A., has resigned as Health Director of Daviess County and is now Health Officer of McLean County. Dr. Lawrence Hubert Medley was elected to succeed him in Daviess County.

DR. GEORGE HERBERT RAMSEY, F.A.P.H.A., of the Johns Hopkins School of Hygiene and Public Health, Baltimore, has been appointed Director of the Division of Communicable Diseases of the New York State Department of Health.

DR. HAROLD JACKSON DAVIS, member A.P.H.A., Epidemiologist of the New York State Department of Health, has been appointed director of medical care for the Temporary Emergency Relief Association.

DR. CHARLES N. DENISON, member A.P.H.A., has been appointed Health Officer of New Hartford, Conn., succeeding Dr. John R. Lee. Dr. Wilbur J. Moore succeeds Dr. Denison as Health Officer of Cheshire.

DR. JAMES W. BASS, of Dallas, member A.P.H.A., was elected president of the Texas Public Health Association at the recent meeting in Dallas.

DR. THEODORE SNYPP, of Auburn, Calif., succeeds Dr. David M. Kindopp as Health Officer of Placer County, Calif.

DR. CHARLES C. DUBOIS, formerly Health Officer of Warsaw, Ind., was elected Mayor recently.

DR. WLLIAM W. MCFARLAND, member A.P.H.A., has been appointed Director of Health of Pittsburgh, to succeed the late Dr. Charles B. Maits, F.A.P.H.A.

DR. THOMAS C. LYNCH, of Wichita Falls, was recently appointed Health Officer of Wichita County, Tex.

DR. WALTER L. BIERING, of Des Moines, Ia., has been appointed State Health Commissioner of Iowa, effective July 1.

DEATHS

CLARENCE A. SHORE, M.D., F.A.P.H.A., of Raleigh, N. C., died on February 10, 1933. For 25 years Dr. Shore was Director of the Division of Laboratories of the North Carolina State Board of Health. He was a native of Winston-Salem, N. C., and a graduate of the University of North Carolina. He received his medical degree from Hopkins in 1907. He built a first-class laboratory, which has rendered invaluable service to the people of his state. In 1929 he was awarded the Doctor of Science degree from the State University as a recognition of his important service in the promotion of scientific progress. He has been a member of the A.P.H.A. since 1909, and a Fellow since 1923.

DR. CHARLES O. PROBST, of Columbus, Ohio, superintendent of the Franklin County Tuberculosis Sanatorium, died on April 2, at the age of 75. He

was secretary of the American Public Health Association for more than 10 years, and was also a former president of the Association. He became a member of the A.P.H.A. in 1886 and a Fellow in 1926.

RENÉ VALLERY-RADOT died on January 24, 1933, at the Hospital of the Pasteur Institute. He was the President of the Council of Administraton of the Pasteur Institute of Paris. He is best known to us as a historian and biographer of Pasteur. He was the son-in-law of Pasteur, having married his daughter, Marie-Louise. Apart from his biography, he had a high reputation as a writer, having had special training from his father in this line. He had also made a place for himself as a diplomat.—*Ann. de l'Inst. Pasteur,* Feb., 1933.

DR. L. C. HAVENS, Director of Laboratories of the Alabama State Health Department since 1921, died after a heart attack at his home on March 19, 1933. He was born at Lebanon, N. H., in 1891. He studied at the University of Colorado and Harvard University and was Assistant Professor of Immunology in the School of Hygiene at Johns Hopkins University before coming to Alabama. Dr. Havens has been a member since 1920 and a very active Fellow of the Laboratory Section of the A.P.H.A. since 1931; and has presented papers at our meetings dealing with methods of isolating typhoid bacilli, a subject in which he was an outstanding authority. At the time of his death he was a member of the Committee on Standard Methods.

JAMES R. MCCLINTOCK of the firm of Fuller & McClintock, died on April 11, of a heart attack following an illness of several weeks with influenza and bronchitis. He was educated at the University of Rochester and the Massachusetts Institute of Technology from which he was graduated in 1906. His entire professional career was spent with Hering & Fuller, the firm of George W. Fuller and the firm of Fuller & McClintock which was organized in 1916. Mr. McClintock was a member of the American Society of Civil Engineers, American Society of Mechanical Engineers, American Institute of Consulting Engineers, American Water Works Association, and the American Public Health Association.

CONFERENCES

April 29–May 6, National Boys' Week.

May 1—May Day—Child Health Day.

May 29–31, Western Branch, A.P.H.A., Pasadena, Calif.

June 5–6, State and Provincial Health Authorities of North America, Washington, D. C.

June 5–6, State and Territorial Health Officers Conference, Washington, D. C.

June 11–17, National Conference of Social Work, Detroit, Mich.

June 12–17, American Medical Association, Milwaukee, Wis.

June 20–24, Seventh Health Education Conference, Ann Arbor, Mich.

June 26–30, National Tuberculosis Association, Toronto, Canada.

June 26–30, Annual Meeting of the American Home Economics Association, Milwaukee, Wis.

June 27–July 1, Convention of the Association for Childhood Education, Denver, Colo.

June 28–July 3, International Hospital Congress, Knocke-sur-Mer, Belgium.

July 1–7, National Education Association, Chicago.